PART 3: THE RESPONSIVENESS SUMMARY

A. PUBLIC COMMENTS AND EPA RESPONSES

EPA published the notice of availability of the Proposed Plan and Administrative Record for the Olin Chemical Superfund Site (Site) in the Wilmington Town Crier on August 12, 2020 and released the Proposed Plan to the public by posting a publicly accessible link on EPA's website.

From August 26, 2020 through September 25, 2020, EPA held a thirty-day public comment period to accept public comments on the alternatives presented in the Feasibility Study (FS) and Proposed Plan, and on any other documents previously released to the public. In response to a request from a community member, EPA extended the public comment period an additional thirty days – through October 26, 2020 – for a total of sixty days. On August 25, 2020, EPA held a public informational meeting to provide an overview of the Site history and investigation findings, describe EPA's Proposed Plan, and answer questions. On September 22, 2020, EPA held a Public Hearing to accept oral comments.

In order to adhere to guidance from the Centers for Disease Control (CDC) and state and local restrictions on large gatherings due to the Covid-19 pandemic, both the August 25, 2020 and September 22, 2020 events were conducted virtually via the Adobe Connect platform with closed captioning, including an option to connect to the conference audio via telephone. Both events were simulcast on the local cable access television station – WCTV. Prior to the informational meeting, a copy of EPA's presentation, including the audio recording of EPA's remarks, was available on EPA's webpage for the Site.

During the Public Hearing, three comments were received from local elected officials, one comment was received from a state elected official, four comments were received from members of the local Community Advisory Group (CAG), and two comments were received from Wilmington residents. Additionally, 22 sets of written comments were received from Wilmington residents, the Town of Wilmington Board of Selectmen and the Town's consultant, the Wilmington Environmental Restoration Committee (WERC), Olin Corporation (Olin), Wilmington Woburn Intermodal LLC (WWI) and members of the Massachusetts Institute of Technology (MIT) community during the public comment period. Outlined below is a summary of comments received from the public and other interested parties during the public comment period and EPA's response to those comments. The full text of both the written and oral comments received during the comment period has been included in the Administrative Record for the Site.

B. SUMMARY OF COMMENTS RECEIVED AT THE SEPTEMBER 22, 2020 PUBLIC HEARING

Comment #1 (Jeffrey Hull, Town Manager; Jonathan Eaton, Chairman, Wilmington Board of Selectmen; and Stephanie Baima, WERC)

The goal of the groundwater remediation should be the restoration of the Town of Wilmington's drinking water.

EPA Response:

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the regulations governing the assessment and cleanup of sites under Superfund, describes EPA's expectations for groundwater restoration and states that EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction. 40 C.F.R. § 300.430(a)(1)(iii)(F). Portions of the aquifer at the Site are classified as drinking water sources. Furthermore, the Massachusetts Department of Environmental Protection (MassDEP) has assigned a high use and value for the Site area aquifer in its Groundwater Use and Value Determination (MassDEP, 2010a). As such, the goal for the groundwater would be to restore this aquifer to its beneficial use, unless it is determined not to be practicable. There is insufficient data at this time to make this determination. Further work is underway to finish characterizing the nature and extent of contamination in the aquifer and to develop and evaluate a set of alternatives to address the groundwater contamination. Once this investigation is completed, EPA will issue a final Record of Decision (ROD) for groundwater identifying the final cleanup goals for groundwater at the Site.

Comment #2

(Jeffrey Hull, Town Manager) Site redevelopment must wait for the completion of remedial activities or work around any remedial activities.

(Suzanne Sullivan, WERC) Any remaining data gaps should be filled prior to redevelopment and closeout of Operable Unit 1 (OU1) and Operable Unit 2 (OU2). Operable Unit 3 (OU3) should not be separated from OU1 and OU2.

EPA Response:

While EPA does not dictate the terms of redevelopment, if redevelopment occurs, EPA will ensure that such redevelopment does not adversely impact the selected remedy for the Site and EPA's efforts to collect more data as needed to select and implement a final remedy for groundwater (OU3). EPA will also ensure that the developer refrains from using the Olin property (Property) in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of any past or future response actions.

EPA has divided the cleanup of the Site into Operable Units (OUs) in order to expedite the remediation for those source areas considered to be sufficiently characterized to move forward with remedy selection. While the primary sources of impacts to groundwater (OU3) are addressed as interim actions in this selected remedy, significant data gaps remain regarding the extent of groundwater impacts, particularly in bedrock. The OU3 Remedial Investigation (RI) is

ongoing and will incorporate the additional chemical, geological, and hydrogeological data collected. EPA is working closely with Olin to ensure that the OU3 RI, including the ongoing data gaps investigation, is comprehensive and will result in data of sufficient quality and quantity to support development of an FS and final remedy for Site groundwater.

Comment #3

(Jeffrey Hull, Town Manager) The remediation goal for the groundwater hot spot should be lowered below 5,000 nanograms per Liter (ng/L) as soon as practicable.

(Gary Mercer and Suzanne Sullivan, WERC) The groundwater hot spot should use 1,100 ng/L as the remedial goal.

EPA Response:

Remediation goals and cleanup levels for groundwater will be established by EPA in the final remedy for groundwater (OU3). The 5,000 ng/L and 1,100 ng/L n-nitrosodimethylamine (NDMA) concentration contours are not remediation goals. The 5,000 ng/L contour is the approximate area that EPA is targeting to begin mass removal of contaminants from the aquifer as an interim action. EPA evaluated several options for where to target the initial mass removal actions, including targeting the areas defined by the 1,100 ng/L, 5,000 ng/L, and 11,000 ng/L NDMA contours. According to Olin's calculations, the 5,000 ng/L contour contains an estimated 4,440 grams (g) of NDMA and would require the treatment of approximately 68.4 million gallons of water to remove this mass. The 1,100 ng/L contour contains an estimated 4,747 g of NDMA and would require the treatment of approximately 110.3 million gallons of water, almost twice the volume of water for an additional 307 g of NDMA removal. Since the goal of the interim action for groundwater is mass removal, the selected remedy appropriately targets the 5,000 ng/L contour based on mass of NDMA removed and the volume of groundwater requiring treatment. At the conclusion of the data gaps investigation for groundwater, EPA will prepare an FS that will evaluate additional alternatives targeted at restoration of the aquifer. These alternatives will include options for addressing the contamination beyond the 5,000 ng/L contour. The final ROD for OU3 will specify the final cleanup goals and the approach for achieving those goals.

Comment #4 (Jeffrey Hull, Town Manager)

Discharge of treated groundwater should minimize the transfer of groundwater from one watershed to the other.

EPA Response:

EPA agrees that in general, treated groundwater should be returned to the originating watershed to the extent feasible. However, years of data demonstrate that the water table across the impacted area is very flat with frequent mixing. Also, Dense Aqueous Phase Liquid (DAPL) and impacted groundwater within the bedrock fractures move independently from the watershed divide. Regardless, EPA considers the Site area aquifer (that is, groundwater from both watersheds) to be of high value, and the selected remedy includes extraction of groundwater,

treatment at a newly constructed groundwater treatment system(s), and discharge to surface water. While the precise discharge location will be determined during the pre-design investigations (PDIs) of the Remedial Design (RD) phase, groundwater is not likely to be recharged under the selected remedy. However, long-term groundwater and surface water monitoring will be conducted, which will include evaluation of the impacts of extraction and discharge.

Comment #5 (Jeffrey Hull, Town Manager)

A permanent cap should be installed over the Containment Area.

EPA Response:

EPA agrees with the comment. The cap over the Containment Area will be a permanent feature. The remedial alternative including the cap also includes provisions for long-term monitoring and maintenance to ensure the cap's continued integrity and effectiveness. The cap will be subject to Five Year Reviews by EPA for as long as contamination remains in place above criteria allowing for unrestricted use (residential criteria).

Comment #6 (Jeffrey Hull, Town Manager and Jonathan Eaton, Chairman, Wilmington Board of Selectmen)

The Town of Wilmington is concerned about the imposition of restrictions of wells in the area and would like to receive examples of regulations or bylaws that EPA has developed for other communities.

EPA Response:

Comment noted. EPA will share examples of regulations developed by and for other communities. Institutional Controls on groundwater use are frequently implemented as part of remedies for Superfund sites. EPA's primary objective is the protection of public health; however, EPA understands the unintended consequences of overly restrictive controls. EPA will work closely and cooperatively with the Town of Wilmington to develop restrictions which provide for as much flexibility as possible with the goal of ensuring that members of the community are not exposed to contamination associated with the Site. EPA's general goals for the Institutional Controls include making sure that residents and other community members are not extracting water that is unsafe to use, and ensuring that groundwater extraction that may interfere with the implementation of EPA's remedy does not occur. One example of Institutional Controls is the Groundwater Management Zone created by the Town of Durham, Connecticut for the Durham Meadows Superfund Site (available at: https://ecode360.com/30752082).

Comment #7 (Jomarie O'Mahony)

The remedy selection should not consider cost.

EPA Response:

EPA is required by statute and regulation to consider cost in the Superfund remedy selection process. See *e.g.*, 42 U.S.C. § 9621(a)-(b); 40 C.F.R. §§ 300.430(e)(7)(iii) and 430(f)(1)(ii)(D). In addition, cost is included in EPA guidance (*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. Interim Final.* October 1988. EPA/540/H-89/004) as a primary balancing criterion, along with long-term effectiveness and permanence, reduction of toxicity, mobility, and volume through treatment, short-term effectiveness, and implementability. The threshold criteria that must be met for remedy selection are overall protection of human health and the environment and compliance with Applicable and Relevant and Appropriate Requirements (ARARs). The preamble to the 1990 NCP (page 55 FR 8728 available at: https://semspub.epa.gov/work/HQ/174999.pdf and beginning on page 161 of the 376-page pdf) states in part (emphasis added):

> *…EPA notes that many alternatives will be protective but will achieve that protection through different methods or combinations of methods…alternatives may emerge from the detailed analysis as comparably "effective," in terms of the three effectiveness criteria of long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment and short-term effectiveness; in that event, the least costly of the comparably effective alternatives would be identified as cost-effective while the others would not. However, because the remedy selection process usually involves consideration of a range of distinct alternatives that generally vary in their effectiveness and cost, most often a comparative analysis of the relationship between the overall effectiveness of the alternatives and their costs will be required to determine which alternatives are cost-effective (i.e., provide overall effectiveness proportional to their costs)…*

The preamble to the 1985 NCP (see 55 FR 8727 available at https://semspub.epa.gov/work/HQ/174999.pdf and beginning on page 158 of the 376-page pdf, referencing 50 FR 47921) also explains the role of cost and states in part (emphasis added):

> *…The approach embodied in today's rule is to select a cost-effective alternative from a range of remedies that protects the public health and welfare and the environment. First, it is clear that if all the remedies examined are equally feasible, reliable, and provide the same level of protection, the lead agency will select the least expensive remedy. Second, where all factors are not equal, the lead agency must evaluate the cost, level of protection, and reliability of each alternative. In evaluating the cost of remedial alternatives, the lead agency must consider not only immediate capital costs, but also the costs of operating and maintaining the remedy for the period required to protect public health and welfare and the environment. For example, the lead agency might select a treatment or destruction technology with a higher capital cost than long-term containment because treatment or destruction might offer a permanent solution to the problem…*
>
> * * *

...Finally, the lead agency would not always select the most protective option, regardless of cost. The lead agency would instead consider costs, technology, reliability, administrative and other concerns, and their effects on public health and welfare and the environment. This allows selection of an alternative that is the most appropriate for the specific site in question...

The preamble to the 1990 NCP states that it continues the approach outlined in the preamble to the 1985 NCP. The preamble (page 55 FR 8727) states in part:

...Today's rule continues the approach embodied in the 1985 NCP, although some of the terminology has changed. First, the approach promulgated today requires that alternatives are determined to be adequately protective and ARAR-compliant before cost-effectiveness is considered in remedy selection (see § 300.430(f)(1)(ii)(D)). Second, today's rule recognizes that a range of alternatives can be protective and ARAR-compliant, and that cost is a legitimate factor for choosing among such alternatives...

Comment #8 (Gary Mercer, WERC)

An alternative should be developed for the removal of all impacted soils from within the Containment Area.

EPA Response:

EPA tasked Olin with developing an excavation and disposal alternative for Containment Area soil. This was developed in the *Interim Action Feasibility Study* (*FS Report Volume II;* Olin, 2020b) as "Alternative CA-3: Targeted Soil Removal." EPA's intent in developing this remedial option for the Containment Area was to establish an excavation alternative for all areas within the Containment Area where concentrations of Site contaminants exceed the Preliminary Remediation Goals (PRGs) for the Site. To conceptualize the alternative, excavation areas were assumed based on existing soil data where PRGs of 3 milligrams per kilogram (mg/kg) for bis-2-ethylhexylphthalate (BEHP) or 1,000 mg/kg for chromium were exceeded. The water table in the Containment Area within the Containment Area is generally around 8 feet (ft) below ground surface (bgs). Assuming an excavation depth of 10 ft bgs yielded an in-situ volume of approximately 45,000 cubic yards of material to be excavated. However, given the limited sampling data from the Containment Area, EPA believes the actual volume would likely be significantly larger upon execution of the alternative. The limits of the excavation areas would be determined based on PDIs during the RD phase.

Significant implementability and worker safety concerns are associated with Alternative CA-3 with regard to shoring up 10-foot plus excavations across the Containment Area feature to address structural stability concerns, handling and transporting the large volume of waste materials off-site, and impacts to the community from increased transportation of hazardous materials, backfill, and other remedy-related equipment. The capping alternative selected for the Containment Area eliminates risks to human health and ecological receptors from direct exposure to Site contaminants, and prevents leaching of Site contaminants into groundwater, surface water, and sediments at levels that would pose unacceptable risks to human health and the environment,

while creating the least risk and impacts to the community by handling the least amount of contaminated materials.

Comment #9 (Gary Mercer, WERC)

An alternative should be developed to consolidate impacted soils such as upland soils and trimethylpentene (TMP)-impacted soils within the Containment Area.

EPA Response:

EPA did consider an alternative that involved consolidation of impacted soil on the Property within the Containment Area. However, the alternative was screened out from consideration for two reasons. First, upland soil poses an ecological risk to birds that may feed in the area. These soils do not pose a significant risk of leaching to groundwater; therefore, an impermeable or low-permeability cap is not needed to eliminate the threat. Second, the volume of upland soil posing a threat to ecological receptors and TMP-containing soil posing a potential human health threat as presented in the FS was thought to significantly underestimate the actual volume. Although the FS depicts these areas to be finite based on the sampling conducted during the RI, the sampling data used to estimate these volumes of impacted soil are limited; the impacted areas requiring remediation are likely to be much larger, resulting in significantly larger volumes to manage. EPA anticipated that the contamination posing unacceptable ecological and human health threats was likely to be more widespread and would require extensive excavation of large volumes of soil which were not likely to fit within the footprint of the Containment Area.

According to the *FS Report Volume I* (Olin, 2020a), the total volume of soil that could be consolidated under the cap is 12,808 cubic yards (cy) or approximately 345,800 cubic feet (cf). This total was found by adding the volume of TMP-containing soil (5,648 cy), upland soil from 0 to 1 foot (ft) bgs (2,400 cy) minus an estimated 240 cy that would need to be transported off-site as hazardous waste for 2,160 cy total, and wetland soil and sediments from 0-1 ft bgs (roughly 5,000 cy). The area of the cap is approximately 200,000 square feet (sq. ft) or roughly 4.6 acres. Assuming that the slurry wall is fairly close to the edge of the cap, placing excavated soil within the Containment Area in a 1 ft-thick layer would use 1,613 cy per acre-ft. Taking the total volume of impacted soil of 12,808 cy and dividing by 1,613 cy per acre-ft yields 7.9 acre-ft. Assuming the entire cap area is used, 7.9 acre-ft divided by 4.6 acres yields a 1.72 ft elevation increase across the entire cap area. Assuming only half the cap is used would result in 7.9 acre-ft being divided by 2.3 acres, which yields a 3.4 ft elevation increase across half the cap area.

While these estimates may suggest that the volume of impacted upland and TMP-containing soil on the Property may be reasonably consolidated within the Containment Area, these volumes very likely underestimate the actual volume of impacted soil that would be determined during the PDI component of the RD phase. Since capping these soils in place with clean soil or pavement provided an effective alternative to address the risk, this capping alternative was carried through the detailed evaluation process in the FS.

Comment #10 (Gary Mercer, WERC)

The preliminary remediation goal for ammonia in surface water is too high.

EPA Response:
In response to this comment, EPA has re-evaluated the surface water performance standards for ammonia (see Nobis, 2021). The surface water performance standard for ammonia in the Proposed Plan was calculated using procedures described in the *Aquatic Life Ambient Water Quality Criterion for Ammonia – Freshwater* (USEPA, 2013a) to establish the Criterion Continuous Concentration (CCC). The CCC is a value below which adverse effects would not be expected for the majority of aquatic receptors. For ammonia, the CCC is dependent on the temperature and pH of the water body or stream. We believe that the site-specific assumptions used for pH are appropriate, and pH has been, overall, less variable over time in both the South Ditch Stream and East Ditch Stream.

EPA believes that a slight adjustment in the performance standard is needed based on the assumptions used for temperature. The proposed performance standard for ammonia was based on an average spring instream temperature of 7.13 °C for East Ditch Stream and 6.92°C for South Ditch Stream**.** While EPA agrees that generally spring temperatures should be utilized as the basis, EPA believes that it is more appropriate to use an average of the in-stream temperatures in late spring (between May – June, not January – March). Late spring temperatures reflect a period when aquatic receptors will be more active, and epi-benthic organisms that are exposed to ambient water will be present in the water column. Also, the Baseline Ecological Risk Assessment (BERA) assumes that the Marsh Wren and Green Heron may forage on-site. Adjusting to late spring temperatures would account for the time when both species would be present and breeding in New England. Therefore, EPA believes that the performance standard should be adjusted to 9 milligrams per Liter (mg/L), based on an in-stream temperature of 18 ˚C and pH of 6.6. The in-stream temperature is the 95% Upper Confidence Limit (UCL) of the temperature values from mid-May through June. The revised performance standard of 9 mg/L has been added to the ROD.

Comment #11 (Gary Mercer, WERC)

There is insufficient analysis to show that groundwater extraction wells would be adequate to intercept ammonia and chromium and sufficiently reduce their concentrations in surface water.

EPA Response:

A PDI is included in the selected remedy for surface water. As described in the *Volume 1, Operable Unit 1 & Operable Unit 2 Feasibility Study, Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts* (*FS Report Volume I*, Olin, 2020a), the PDI may include additional surface water sampling, evaluation of potential groundwater seepage locations, as well as a shallow groundwater hydrology evaluation to site the extraction wells to intercept ammonia and chromium. The surface water alternative also includes monitoring provisions to ensure that the surface water concentrations are reduced below applicable criteria. If monitoring indicates that the groundwater interception system is inadequate, EPA may require modifications to the system to address its deficiencies.

Comment #12 (Martha Stevenson and Suzanne Sullivan, WERC)

The virtual meeting format is not as effective as the in-person format for public meetings.

EPA Response:

Comment noted. EPA is balancing the need to continue progress towards selecting a cleanup remedy for the Site with the need to protect public health during the COVID-19 pandemic. For this public hearing, EPA followed the April 16, 2020 Memorandum regarding virtual public hearings and meetings (USEPA, 2020e), which states in part:

> *Virtual public hearings and meetings are a permissible tool under the federal environmental statutes that EPA administers to provide for public participation in permitting, rulemaking, and similar regulatory actions in lieu of in-person public hearings and meetings. Virtual public meetings are also permissible when conducting public engagement at Superfund sites.*

Comment #13 (Suzanne Sullivan, WERC)

The potential truck traffic impact of removing soil is not a significant impact and should not be weighted during alternative development and selection.

EPA Response:

Evaluation of potential impacts to the community from transport of waste materials off-site is included in EPA guidance (*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. Interim Final.* October 1988. EPA/540/H-89/004). Section 6.2.3.5 – Short-Term Effectiveness – requires remedial alternatives to be evaluated with respect to their effects on human health and the environment during implementation of the remedial action and states in part (emphasis added):

> *The following factors should be addressed as appropriate for each alternative:*
>
> - *Protection of the community during remedial actions – This aspect of short-term effectiveness addresses any risk that results from implementation of the proposed remedial action, such as dust from excavation, transportation of hazardous materials, or air-quality impacts from a stripping tower operation that may affect human health.*

Table 6-3 – Short-Term Effectiveness – provides this list of questions to consider in analyzing the short-term effectiveness of the remedial alternative in protecting the community during remedial actions:

- *What are the risks to the community during remedial actions that must be addressed?*
- *How will the risks to the community be addressed and mitigated?*
- *What risks remain to the community that cannot be readily controlled?*

The potential impacts of excavating and removing soil were considered in evaluating the short-term effectiveness of the soil cleanup alternatives, all of which, except for the No Action

Alternative, included removal of contaminated material to varying degrees. The potential short-term impacts considered by EPA included fugitive air emissions during excavation and from trucks transporting wastes, and the potential for accidents and spills. These impacts can be mitigated by best management practices, as noted in the Proposed Plan. It is EPA's experience that truck traffic and its associated impacts to a neighborhood, and in particular, the hazardous contents of trucks transporting wastes from a site, is frequently cited by community members as a concern for alternatives involving excavation and transport of material from Superfund sites. However, short-term effectiveness is one of the five balancing criteria that EPA is required by statute to consider in selecting a remedy and is secondary to the criteria of overall protection of human health and the environment and compliance with ARARs.

Comment #14 (Suzanne Sullivan, WERC)

The Zone 2 delineation performed by MassDEP pre-dates installation of the Containment Area and should be revisited.

EPA Response:

EPA presumes that the commenter believes the Zone 2 boundary should be expanded to include more of the Site. EPA also presumes that the commenter believes that expanding the Zone 2 will result in different cleanup goals for the Property. It is true that MassDEP developed the Zone 2 many years ago and some of the facts which form the basis for the Zone 2 designation may have changed. However, moving the Zone 2 or expanding it to include the Containment Area will not alter the remedial action objectives for the selected remedy.

The NCP – the regulations governing the assessment and cleanup of sites under Superfund – describes EPA's expectations for groundwater restoration and states that EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction. 40 C.F.R. § 300.430(a)(1)(iii)(F). Since portions of the aquifer at the Site are classified as drinking water sources and since MassDEP has assigned a high use and value for the Site area aquifer in its Groundwater Use and Value Determination (MassDEP, 2010a), the goal for the groundwater would be to restore this aquifer to its beneficial use, unless it is determined not to be practicable. Since there is insufficient data at this time to determine whether full restoration is practicable, EPA's remedial action objectives for this portion of the remedy focused on removing the source, minimizing further migration of contaminants, and preventing exposure.

Further work is underway to finish characterizing the nature and extent of contamination in the aquifer and to develop and evaluate a set of alternatives to restore the groundwater to its beneficial use as a drinking water aquifer. Once this investigation is completed, EPA will issue a final ROD for groundwater identifying the final cleanup goals for groundwater at the Site. Expanding the Zone 2 to include the Containment Area will not result in a different outcome as the goals remains the same – restore the aquifer to its beneficial use (as a drinking water source), unless it is determined not to be practicable.

Comment #15 (Liz Harriman, WERC)

The interim action should not be approved before more design studies are performed to determine the rate of source removal.

EPA Response:

EPA's issuance of this selected remedy is not an "approval" of the conceptual design presented in the FS. EPA also agrees that the rate of source removal is a critical performance criterion that needs further evaluation during the design phase. However, EPA believes that sufficient data exists to issue a ROD that includes source removal actions for DAPL and groundwater hot spots as a key component of the initial remedy for OU3 (groundwater).

With regards to DAPL, a formal field scale pilot study – the Jewel Drive DAPL extraction pilot – was conducted between 2012 and 2015 to evaluate the feasibility of extracting DAPL. The pilot confirmed the feasibility of extracting DAPL from the aquifer. EPA has not yet determined the final extraction rates for each well or the final number of wells that will be needed to optimize the overall rate of removal of DAPL from the aquifer. The design phase for the DAPL and groundwater hot spot interim remedy will include an evaluation of other extraction methods (such as larger well screens) and different well configurations to expedite DAPL removal.

With regards to groundwater hot spots, the design will include an evaluation of how best to optimize source removal from groundwater while not interfering with DAPL removal. The final design of the extraction systems and identification of removal rates must be reviewed and approved by EPA before the remedy is fully implemented.

Comment #16 (Liz Harriman, WERC)

The design and installation of extraction wells should take place as soon as possible.

EPA Response:

EPA agrees that strong efforts should be made to hasten the pace of remedy design and implementation, while meeting EPA's obligations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the NCP. EPA also agrees that source removal is a critical next step and will be a priority moving forward.

Comment #17 (Ethan Sawyer)

The speaker was concerned that the Olin property will be used for transmodal (truck to rail) storage and transportation of chemicals such as chlorine.

EPA Response:

Property use will be determined by local planning authorities and the property owner. EPA does not have the authority under CERCLA to dictate the future use of the Property. However, if

redevelopment occurs, EPA will review any redevelopment plans to ensure that such redevelopment does not adversely impact the selected remedy for the Site and that the Site is safe for its intended use. A goal of the current interim remedy to address the major sources of contamination in groundwater and the final remedy for contaminated soil, sediments, and surface water is to remediate the Property to a level that is safe for a commercial/industrial use based on the current zoning. Please see also EPA's response to Comment #2 in **Section B**, above.

Comment #18 (Ethan Sawyer)

Wants to see stronger land use restrictions on the Olin property in addition to groundwater use restrictions.

EPA Response:

Land use restrictions for the Property, together with other Institutional Controls, will be developed in consultation with the Town of Wilmington and MassDEP, based on current zoning, known areas of contamination, and receptors at risk. EPA's general goals for land use restrictions include ensuring that members of the community are not exposed to contamination associated with the Site and that use of the Property does not interfere with the implementation of EPA's remedy. See also EPA's response to Comment #6 in **Section B**, above.

Comment #19 (Stephanie Baima, WERC)

Olin's preferences for remediation should not be taken into consideration for remedy selection.

EPA Response:

EPA's proposed cleanup remedy for the Site, as presented in the Proposed Plan, is based on EPA's review of the nine statutory criteria presented in the Superfund law and regulations for remedy selection. According to the Superfund law and regulations, EPA must also consider and respond to all comments received during the 60-day public comment period on the proposed remedy, including those provided by Olin.

Comment #20 (Multiple community members and representatives)

Multiple commenters expressed dissatisfaction with the pace of the cleanup.

EPA Response:

EPA acknowledges that the pace of the investigation has been slower than desired. The Site is among the more complex CERCLA sites in New England, which has posed challenges in determining the extent of contamination and how the contamination has migrated within the environment. The presence of DAPL at a Superfund site is rare and the chemical and physical properties of the DAPL present at the Site are largely unique to this Site. The hydraulic setting is complicated by the location of a major groundwater divide and the complex bedrock geology of the groundwater study area. EPA is also required by statute to rely on Potentially Responsible

Party (PRP) participation, where a viable PRP is present, to lead site investigations and cleanups under EPA oversight. The issuance of the ROD is a major milestone in the Superfund process, and EPA is hopeful that this accomplishment will help facilitate more expeditious cleanup work.

C. COMMENTS RECEIVED IN WRITING DURING THE PUBLIC COMMENT PERIOD

I. Written comments submitted by Olin on October 2, 2020

Comment #1

Specific design details for several remedial alternatives will depend on the planned pre-design investigations: location and number of groundwater and DAPL extraction wells, equipment for groundwater and DAPL treatment systems, and delineation of soil and sediment that exceeds PRGs and requires remediation.

EPA Response:

EPA agrees that PDIs are needed to refine the details of the selected remedy, including the location and number of groundwater and DAPL extraction wells, the configuration of the equipment for the groundwater and DAPL treatment systems, and the further delineation of contamination in soil and sediments. These studies will also include evaluating and optimizing the on-site treatment of DAPL prior to off-site disposal of the residuals, with the goal of pre-treating the extracted DAPL to reduce its volume as much as possible – thus reducing the volume of residuals requiring off-site disposal. If it is not feasible to treat DAPL on-site, extracted DAPL will be disposed of off-site at a permitted facility licensed to receive such wastes. However, it is important to note that EPA expects these investigations to be focused and implemented expeditiously such that active cleanup is initiated as soon as possible. The investigations at the Site have been ongoing for a very long time, with little progress in the actual cleanup. The dynamic of work at the Site must shift such that the PDIs do not become another long-term phase of the investigation. In order to facilitate the rapid implementation of DAPL extraction and treatment, the PDIs may need to incorporate treatability studies and additional field investigations (either pilot-scale or full-scale). For example, piloting extraction of DAPL in known bedrock low spots, even while the bedrock topography continues to be fully investigated, may be appropriate.

Comment #2

The currently operating groundwater and Light Non-Aqueous Phase Liquid (LNAPL) treatment and extraction system adjacent to East Ditch Stream (the Plant B treatment system) is operating as intended and LNAPL is not currently flowing into any surface water bodies. LNAPL (or other non-aqueous phase liquids) have not been observed in the vicinity of South Ditch, On-Property West Ditch, or Off-Property West Ditch Streams.

EPA Response:

Clarification noted.

Comment #3

The cap planned for the Containment Area should be a low-permeability cap, as specified in the OU1/OU2 FS, and not an impermeable cap as indicated in the Proposed Plan. The final details of the cap will be determined during the RD phase.

EPA Response:

The selected remedy includes the construction and maintenance of caps and cover systems on areas of soil contamination on the Property, including a multi-layer, *low-permeability cap* that meets Resource Conservation and Recovery Act (RCRA) Subtitle D and Massachusetts solid waste landfill performance standards over the Containment Area. The term *impermeable cap* in the Proposed Plan is fundamentally not different than a *low-permeability cap* required to meet ARARs. *Volume III – Comparative Analyses, Feasibility Study Report, Olin Chemical Superfund Site, Wilmington, Massachusetts* (*FS Report Volume III*, USEPA, 2020c) states:

> *Alternative SOIL/SED-2 includes an* impermeable cap *above the contaminated soil in and near the Containment Area…The cap for the Containment Area would comply with Resource Conservation and Recovery Act (RCRA) Subtitle D regulations and Massachusetts solid waste management regulations and meet impermeability requirements with an effective permeability that is equivalent to the permeability of the existing slurry wall (approximately $1x10^{-8}$ centimeters per second (cm/sec)) or a permeability of no greater than $1x10^{-7}$ cm/sec, whichever is less…*

Comment #4

Previous investigations have shown that there is no reasonable likelihood of contaminants leaching at unacceptable levels from the Containment Area, as demonstrated through analysis of samples collected for the 2019 Containment Area soil investigation and supported by historical data. In addition, human health evaluation has not identified unacceptable health risk for future land uses (which will be restricted or prohibited by Institutional Controls). While Olin does not disagree with the need for a cap, the leaching concerns are not supported by the available data.

EPA Response:

EPA disagrees with the comment, as insufficient data exists to conclude that there is no reasonable likelihood of contaminants leaching from soil to groundwater at unacceptable levels from the Containment Area. During the OU1/OU2 RI, characterization of Containment Area soil was limited to surface samples from beneath the temporary cap. Deeper samples were not collected at that time to avoid potential damage to the temporary cap that may have resulted from the presence of a drill rig.

The November 2019 Containment Area soil investigation referenced above was generally conducted in locations that targeted previously excavated areas, former disposal pits and lagoons, and other potential former disposal areas. The majority of samples collected during this event were from shallow sample intervals; a total of 103 discrete soil samples were collected, 76 of which (74%) were from depths shallower than 10 ft bgs. Additionally, the spatial resolution of

the soil boring locations cannot be considered comprehensive, as a total 12 soil borings were used to assess a study area nearly five acres in size. The degree of interpolation required between sampling locations from the November 2019 soil investigation combined with the limitations of the surficial soil sample data set from the OU1/OU2 RI would, in the opinion of EPA, preclude a definitive conclusion regarding contaminant leaching from Containment Area soil.

Major findings from EPA's Memorandum entitled *Updates to OU1/OU2 RI Report Conclusions* (USEPA, 2020a) include the following:

- Significant volumes of acidic wastewaters and other wastes, including containerized and laboratory wastes from various facility production operations, were disposed of within the Containment Area from approximately 1965 until at least 1983;
- Specific areas within the Containment Area – primarily the drum and buried debris areas – have been remediated, but these areas represent a fraction of the total extent of the Containment Area. Therefore, unsaturated soil within the Containment Area likely contains waste materials; and
- The solid wastes in the Containment Area will need to be contained, a remedial action that would include the prevention of leaching of chemicals or constituents from such wastes, in accordance with RCRA Subtitle D regulations and Massachusetts Solid Waste Management Facility Regulations is appropriate.

The selected remedial actions for the Containment Area, which include closure of the equalization window, installation of a permanent, low-permeability cap, and DAPL extraction, will significantly reduce the potential for adverse groundwater impacts from the Containment Area.

Comment #5

The September 21, 2010 Use and Value Determination identified only portions of the groundwater impacted by the Site as current or potential future drinking water source areas that meet the criteria for Category GW-1 groundwater, and classified the remainder of the Site groundwater as GW-2/GW-3 (not current or potential future drinking water source areas).

EPA Response:

Comment noted, however, the September 21, 2010 Groundwater Use and Value Determination (MassDEP, 2010a) identified a high use and value for the Site area groundwater aquifer:

> *Because a portion of the Site falls within a GW-1 area, (the Zone II to the north) and the close proximity to private drinking water wells to the southeast and the GW-1 Potential Drinking Water Source Area to the south, and in light of the factors contained in EPA's Final Ground Water Use and Value Determination Guidance, the Department supports a high use and value for the Site area aquifer (See Attached Table: Groundwater Use and Value Factors)…*

Comment #6

The Proposed Plan indicates a potential need to extract "hot spot" groundwater from immediately above the DAPL pools. Current data is limited to a single well point but does not support the presence of a significant NDMA hot spot above the DAPL pool. The data gap investigation will verify current conditions. In addition, Olin believes that extraction of groundwater immediately above the DAPL pools will exacerbate conditions by causing convection and dilution of DAPL. The DAPL pilot test results suggest that the gravimetric DAPL recovery from the bottom of the DAPL pool will result in progressive drawdown of the DAPL/diffuse layer interface, stranding any extraction wells set above the DAPL pool.

EPA Response:

EPA agrees that additional evaluation is required to determine the thickness and extent of the groundwater hot spot above each of the DAPL pools, as well as the aquifer response to removal of DAPL. There may be advantages to phasing the work, with initial remediation focused on DAPL pool removal and subsequent groundwater extraction after the DAPL pool has been partially drawn down. These evaluations and exploration of phasing will be included in the PDIs and RD phase.

Comment #7

The Proposed Plan reflects the initial assumptions related to the operations required to successfully treat DAPL and impacted groundwater; these assumptions will require verification through treatability and potentially pilot-scale studies. The PDIs and RD will identify the location for the new treatment system and alignment of associated piping and appurtenances.

EPA Response:

EPA agrees with the comment. The selected remedy explains that the treatment system details for both DAPL and impacted groundwater will be determined based on PDIs and refined in the RD.

Comment #8

The available information indicates that the LNAPL in the subsurface is the result of a release of rubber process oil #425 from storage tank #6 (a raw material for chemical manufacturing) and not a fuel oil spill. The LNAPL has been contaminated by historical, co-located releases of bis-2-ethylhexylphthalate (BEHP), n-nitrosodiphenylamine (NDPhA), and TMPs. The process oil itself did not contain these constituents. This information is included in Figure 1.3-2, Table 1.4-1, and text of Section 1.4.2.2 of the 2015 OU1/OU2 RI Report.

EPA Response:

Part 2, **Section B**, **SITE HISTORY AND ENFORCEMENT ACTIVITIES**, History of Site, above, of this ROD explains that #415 process oil was a raw material utilized during the operating history of the Property. This section further explains that the LNAPL was released to soil and the subsurface in the area of the Plant B tank farm in the form of a processing oil. According to the *Comprehensive Site Assessment Phase II Field Investigation Report* (CRA, 1993), interviews with former workers at Plant B indicate that multiple spills occurred in the

Plant B area. Materials allegedly spilled included diisobutylene, diphenylamine, dioctylphthalate, dioctyldiphenylamine, and fuel oil. According to the *Supplemental Phase II Report* (Smith, 1997), as early as 1973, MassDEP contacted the Facility about a seep of oily material in East Ditch Stream, adjacent to the Plant B tank farm. A 1973 analysis of the oil (from well IW-11) indicated that the oil contained a high percentage of BEHP and lesser amounts of NDPhA, dioctylphthalate, and TMPs. **Part 2**, **Section E**, **SITE CHARACTERISTICS**, **Conceptual Site Model** explains that the LNAPL is a mixture of process oil and other raw materials historically stored and used at the former manufacturing facility (Facility) that contains various contaminants, including TMPs and BEHP.

Comment #9

The Proposed Plan noted that benzo(a)pyrene in surface water in Off-Property West Ditch Stream could result in unacceptable risk to trespassers. The available benzo(a)pyrene analytical data for shallow groundwater in the vicinity of this stream do not contain substantial concentrations of benzo(a)pyrene or other high molecular weight polycyclic aromatic hydrocarbon (PAH) compounds that were detected in the stream; likewise, low molecular weight PAHs (more soluble in water) were also not detected in the stream or nearby groundwater. The detection of only less-soluble PAH compounds in the stream suggest that the PAHs are associated with suspended particulate matter. The topography of the Olin property and area to the west do not support runoff toward the stream: on-property flow is toward On-Property West Ditch Stream, and immediately west of the property boundary, the ground surface elevation increases with the elevated PanAm Railway tracks. Finally, the risk calculated in the OU1/OU2 Baseline Human Health Risk Assessment (BHHRA) was based on a single sample result. Other potential PAH sources may include the railroad ties from the rail line and local stormwater runoff from the west. Additional sampling and analysis of surface water for benzo(a)pyrene and other PAHs would be beneficial in determining with more confidence what the representative concentrations are in surface water of Off-Property West Ditch Stream.

EPA Response:

EPA acknowledges that other sources may contribute to the benzo(a)pyrene concentrations in surface water; however, Olin's role as a potential contributor to the contamination has not been ruled out at this time, given the limited surface water and nearby groundwater sampling conducted. Benzo(a)pyrene and other PAHs were detected in surface and subsurface soil on the Property, with the highest concentrations occurring in the vicinity of the former Plant C Boiler and the former Laboratory Building Boiler near the Guard Shack (USEPA, 2020a). EPA's goal is to reduce, to the extent practicable, any sources of PAHs, including benzo(a)pyrene. In the absence of additional data that conclusively rules out the contributions of potential source areas on the Property to surface water in Off-Property West Ditch Stream, surface water impacts in Off-Property West Ditch Stream from Site contaminants are addressed by the selected remedy. Additional sampling is planned to clarify the current contaminant concentrations and trends in Off-Property West Ditch Stream. This sampling will help to determine if source areas on the Property are contributing to benzo(a)pyrene concentrations in Off-Property West Ditch Stream and will be taken into consideration during the RD phase and subsequent remedy implementation phases.

Comment #10

Olin provided suggested wording regarding the discussion of the residential well NDMA results, noting that samples from two wells have consistently had higher concentrations of NDMA than the other wells and that Olin is working with the Town of Wilmington to voluntarily extend a waterline to these two residences. Olin also provided suggested wording regarding the NDMA results from 2017 that were above the risk criterion of 47 ng/L.

EPA Response:

EPA acknowledges that the section in the Proposed Plan that summarizes the private well sampling results could have been clearer. **Part 2**, **Section F**, **CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES, Groundwater/Surface Water Uses** of this ROD explains the following (excerpt in part):

> *…There are 81 private wells (potable and irrigation) on file with the Town of Wilmington within the Site…Of these, 26 residential drinking water wells have been sampled at least once, and 18 are monitored on a quarterly basis to confirm that levels of NDMA do not exceed the upper end of EPA's health-protective cancer risk range of 47 ng/L…NDMA detections in 16 of these wells fall within EPA's health-protective range, with 72% of samples (438 out of 608 samples) showing non-detectable levels of NDMA…Two of the 18 wells have shown consistently higher levels of NDMA over time, with detections in one well ranging from 9.4 to 24 ng/L and detections in the second well ranging from non-detectable to 56 ng/L.[15] Olin has provided bottled water to these two residences since 2010, and is in the process of working with the Town of Wilmington to voluntarily extend a waterline to these two households. A third well had an NDMA detection of 57 ng/L in 2017, but previous and subsequent sampling results for this well were all within EPA's health-protective range.[16]*

Footnote 15 adds:

> *Prior to the 2017 sampling event which yielded an NDMA sampling result of 56 ng/L for one of the two residences on bottled water, sampling data for this well between 2008 and 2016 ranged from non-detectable to 33 ng/L (20 sampling events). Subsequent to the 2017 NDMA result of 56 ng/L, six sampling events were conducted between 2017 and June 2020. These sampling events yielded NDMA results ranging from 0.34 to 2.9 ng/L.*

Footnote 16 adds:

> *Prior to the 2017 sampling event for this well which yielded an NDMA sampling result of 57 ng/L, sampling data for this well between 2015 and 2015 ranged from 1.2 to 8.1 ng/L (five sampling events). Subsequent to the 2017 NDMA result of 57 ng/L, three sampling events were conducted between 2018 and June 2020. These sampling events yielded NDMA results ranging from 0.6 to 7.9 ng/L.*

II. Written general and technical comments submitted by WERC on October 26, 2020

Comment #1

It has been challenging to fully evaluate the more than 1,100 pages of technical documentation released by EPA and Olin in August 2020.

EPA Response:

EPA acknowledges that there has been a significant volume of information to digest. EPA has shared many documents during the course of the investigation with WERC, as well as the Town of Wilmington and their consultant. These documents included correspondence to and from Olin, sampling data, draft reports, and technical memoranda. EPA solicited written comments from WERC and the Town and incorporated such comments where appropriate. EPA met with WERC members on a regular basis to explain results, apprise the group of progress towards remedy selection, and discuss concerns. EPA is open to suggestions for how communications and the sharing of technical information can be improved. Nonetheless, EPA has strived to involve WERC and local officials as active stakeholders in the site investigation and will continue to do so in the next phase of the CERCLA remedial lifecycle for the Site. Please see also EPA's response to Comment #1 in **Section C, III**, below.

Comment #2

The use of a virtual hearing severely limited the participation of residents in both Wilmington and Woburn; in addition, concerns over Covid-19 limited WERC's internal interactions and ability to meet.

EPA Response:

Comment noted. EPA acknowledges these concerns. Please see EPA's response to Comment #12 in **Section B**, above.

Comment #3

WERC continues to be frustrated over the lack of progress at the Site over the preceding decades. EPA should require maximum effort to begin cleanup.

EPA Response:

EPA acknowledges that the pace of the investigation has been slower than desired. EPA agrees that strong efforts should be made to hasten the pace of remedy design and implementation, while meeting EPA's obligations under CERCLA and the NCP. Please see EPA's response to Comments #16 and #20 in **Section B**, above.

Comment #4

The commenter stated that groundwater contamination (OU3) is the sole reason the Olin Site was elevated to the National Priorities List in 2006 and questioned why groundwater has consistently been left

to last in being addressed behind soil and sediment on Olin's parcel of property. EPA's focus always should have been and must now be determining the full extent and severity of the groundwater contamination throughout the entire Site. The proposed Interim Action to remove the worst of the worst groundwater is a good first step, but it is only a half-measure.

EPA Response:

EPA agrees that the groundwater contamination at the Site poses a significant threat to the environment. The issues posed by the unique material present – namely DAPL – have been a challenge to fully understand through the studies completed to date. Over the last few years, EPA has gained a much better understanding of the Conceptual Site Model (CSM) for the Site but there is still insufficient data to select a comprehensive remedy for groundwater. However, given the threats, EPA determined that an interim remedial action is appropriate at the Site to initiate source control while additional information is collected to better assess the practicability of aquifer restoration prior to the determination of final cleanup levels and selection of a final remedial action for groundwater. Accordingly, the cleanup objectives for the interim action were developed to prioritize reduction of exposure risk and reduction of contaminant mass through treatment. The selected interim remedy for groundwater includes the critical outcome of reducing the mass of NDMA in the aquifer by extracting and treating DAPL and groundwater hot spots.

Additionally, **Part 2**, **Section L**, **THE SELECTED REMEDY**, **Description of Remedial Components**, Common Components of the Remedy for All Media, *Pre-Design Investigations* of this ROD explains that a sequencing plan will be developed for implementing the soil and sediments remediation to coordinate work with the remedial actions for DAPL, groundwater hot spots, LNAPL, and surface water to ensure that remedial activities taken to address contamination in soil and sediments are not undermined by recontamination from LNAPL and contamination in groundwater and surface water. The remedial work to address contaminated soil and sediments will be conducted after it is established that discharge from impacted groundwater is not serving as on ongoing source which could negatively impact the quality of wetland soil and sediments. Please see also EPA's responses to Comment #1 in **Section B** and Comment #1 in **Section C, I**, above.

Comment #5

WERC continues its steadfast opposition to any redevelopment at the Olin property before all OU3 investigations are completed and the OU3 Feasibility Study has been approved.

EPA Response:

EPA is not taking a position on whether the Property should be redeveloped and when such redevelopment should occur. However, a redeveloper must cooperate fully with EPA's environmental investigation and response actions at the Site; protect and maintain remedial systems and containment infrastructure; and refrain from using the Property in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of any past or future action. Please see also EPA's responses to Comment #2 and #17 in **Section B**, above.

Comment #6

EPA has fallen short in failing to require that Olin identify the source of NDMA once and for all. Recent studies have identified additional nitrosamines that pose a danger to human health. Aside from one sampling event done several years ago, WERC is not aware of any other investigations to identify other nitrogen compounds related to the manufacturing processes through the decades, or which may have resulted from Olin's various attempts to reduce hydrazine and ammonia levels, which are both present in the Plant B area, as well as widespread across the Site.

EPA Response:

EPA included information about the source of NDMA in the Hazard Ranking System (HRS) documentation record for the Site's listing on the National Priorities List (NPL; see page 19 of the 55-page pdf, available at: https://semspub.epa.gov/work/01/75001014.pdf), which states the following:

> *Although evidence indicates that NDMA was not directly used, produced, purchased, or disposed of at the Olin Chemical facility, there is evidence that the historical disposal of chemical wastes in the unlined pits may have resulted in conditions favorable for NDMA formation in the waste stream, waste disposal structures (unlined pits), DAPL ground water, or diffuse layer ground water (Ref. 8, pp. 24, 25). In particular, the processes for the manufacture of Opex, Kempore, Hydrazine, OBSC/OBSH, Wiltrol-N, Nitropore 5PT, and Nitropore OT produced wastes that when combined may have had the potential to result in NDMA formation (Ref. 8, p. 30). Details of these and other possible NDMA formation mechanisms are discussed in Section 3.1.1 of this HRS documentation record.*

Extensive time has been spent seeking to identify precisely how NDMA formed, without yielding a conclusive finding. At this point, the lack of a full understanding of how NDMA formed does not prevent EPA from making remedial decisions concerning groundwater at the Site. Regardless of how NDMA formed, the interim remedy focuses on removal of NMDA, thus preventing further contamination of the aquifer.

EPA acknowledges a number of data gaps with respect to the distribution of NDMA in the subsurface; however, EPA believes sufficient data exists to issue a ROD that includes source removal actions for DAPL and groundwater hot spots as a key component of the initial remedy for OU3 (groundwater). Continued studies to close remaining data gaps, including additional nitrosamine-precursor and nitrosamine-related compound sampling, will be further evaluated in the RD phase of the selected interim remedy, and in the OU3 Remedial Investigation/Feasibility Study (RI/FS).

Comment #7

The Zone II contribution area to Wilmington's municipal wells should be revised. The Zone II delineation was from a 1990 aquifer study, and the area's hydrological and hydraulic conditions have changed since then, including cessation of pumping of the Town of Wilmington municipal wells and Altron/Sanmina wells, Containment Area construction, and installation of the weir in the South Ditch Stream. Each of

these developments affects the groundwater flows, and a new delineation is important in understanding future impacts of remedial activities and siting of any redevelopment.

We also have concerns regarding the outfall of the NPDES discharges and placement of proposed remedial structures. Over the years Olin has presented various scenarios showing how the groundwater and surface water divides between the Ipswich and Aberjona watersheds vary seasonally and under various pumping demands. Regardless of Olin's attempts to show that very little of their property lies within Wilmington's 1990 Zone II, contamination from Olin reached our town's wells, and has migrated off-property in all directions. If the Zone II delineation is not modified, EPA should remediate all water related to the Site to drinking water standards.

EPA Response:

Comment noted. Please see EPA's response to Comment #14 in **Section B**, above.

Comment #8

Over the years, many interim attempts to remediate various areas on the property were reviewed by local, state, and federal regulators prior to the Site's listing on the NPL, who in turn granted approvals with restrictions and conditions. These limitations on the property must be borne in mind when designing and siting future remedial and/or redevelopment structures. For example, Wilmington Conservation Commission's Order of Conditions and the United States Army Corps of Engineers' (USACE's) Water Quality Certification, which was incorporated into Massachusetts Environmental Policy Act (MEPA) approval of permitting work performed in 2000, prohibits any further alteration or removal of wetlands on the property. While temporary alteration is allowed for essential remedial activities and facilities, no net loss of wetlands is allowed. EPA must require that these restrictions on future activities be enforced.

The protective covenant on the southern portion of the Olin property was negotiated between Olin and the Town to prevent further disturbance to that area. EPA should not allow the siting of any remedial activity in the Conservation Restriction area to facilitate redevelopment. Only actions essential to the cleanup that cannot be located anywhere else should be permitted, and those should be temporary.

EPA Response:

EPA is aware of the conservation restriction, which has preserved the southern portion of the Property (the "Conservation Area") in a predominantly natural, undeveloped condition (Environmental and Open Space Restriction, recorded with the Middlesex North Registry of Deeds on November 7, 2006, Book 20680, Page 234). Currently, EPA is not planning any work within this area other than any remediation that is necessary to address areas with contamination exceeding cleanup levels, which is expressly permitted under the restriction. Wetland areas on the Property requiring remediation are generally located in the immediate environs of South Ditch Stream and areas to the north, though do appear to extend to a limited degree into the Conservation Area.

The selected remedies for LNAPL, surface water, soil, and sediments will comply with all wetland and floodplain ARARs and minimize impacts to wetlands and floodplains. **Part 1**, **Section F**, **SPECIAL FINDINGS**, above, of this ROD explains that pursuant to Section 404 of

the Clean Water Act (CWA), 44 CFR Part 9, and Executive Order 11990 (Protection of Wetlands), EPA has determined that there is no practicable alternative to conducting work that will impact wetlands of the United States because significant levels of contamination exist within or under wetlands of the United States and these areas are included within the Site's cleanup areas.

For those areas impacted by cleanup activities, EPA has also determined that the selected remedy is the Least Environmentally Damaging Practicable Alternative (LEDPA), as required by the CWA, for protecting federal jurisdictional wetlands and aquatic ecosystems at the Site under these standards, because the remedy will permanently remove contaminants that are impairing the wetlands and any wetland resources altered by the cleanup will be restored to the original grade and with native vegetation.

EPA will minimize potential harm and avoid adverse impacts to wetlands, including in the Conservation Area, to the extent practicable, by using best management practices to minimize harmful impacts on wetlands, wildlife, or habitat. Any wetlands affected by remedial work will be restored and/or replicated consistent with the requirements of federal and state wetlands protection laws with native wetland vegetation, and any restoration efforts will be monitored. Mitigation measures will be used to protect wildlife and aquatic life during remediation, as necessary.

The conceptual plans for the selected interim and final remedies do not include remedial infrastructure such as staging areas, extraction wells, conveyance piping, and treatment buildings/systems in the southern portion of the Property, including the Conservation Area. The final location of these and other components of the remedy will be designed to minimize impacts to the Conservation Area. Regarding future development, it will be up to the local conservation commission, which is the grantee under the conservation restriction, to enforce the restriction in this area.

Comment #9

EPA is aware that WERC continues to have serious concerns about the Containment Area. What does it contain? We are not convinced that the soils, sediments, and waste products Olin placed in the Containment Area have been adequately characterized. We suggest that if EPA finds that the Containment Area is not functioning as designed, serious consideration should be given to 'daylighting' the On-Property West Stream, which was culverted at the time the Containment Area was constructed in 2000.

EPA Response:

Significant volumes of acidic wastewaters and other wastes, including containerized and laboratory wastes from various facility production operations, were disposed of within the Containment Area from approximately 1965 until at least 1983 (AMEC, 2015, Section 1.4.2.3). Specific areas within the Containment Area – primarily the drum and buried debris areas – have been remediated, but these areas represent a fraction of the total extent of the Containment Area. Therefore, unsaturated soil within the Containment

Area likely contains waste materials. EPA agrees with the commenter that insufficient data exists to fully characterize the Containment Area. However, the selected remedial actions for the Containment Area, which include closure of the equalization window, installation of a permanent, low-permeability cap, and DAPL extraction, will address the human health risks posed by the Containment Area, and significantly reduce the potential for adverse groundwater impacts from the Containment Area and associated impacts to surface water and sediments. Please see also EPA's response to Comment #4 in **Section C, I**, above.

Regarding the comment concerning the culverted portion of On-Property West Ditch Stream, the culvert is constructed of 30-inch (in) diameter reinforced concrete and was installed between September and October 2000 (GEI, 2004b). The culverted portion of On-Property West Ditch Stream discharges to South Ditch Stream, which is monitored by surface water location PZ-18R at the discharge point and surface water locations SD-17 and PZ-17RRR approximately 150 ft downgradient of the discharge point (see **Figure 27** in **Appendix C** of this ROD). These locations are sampled quarterly (if surface water is available to sample) and the selected remedy for surface water includes long-term monitoring of these and other locations. Based on most recent data available and previous surface water trends, the Site contaminant concentrations at surface water location PZ-18R are comparable to the closest upgradient surface water sample location (ISCO1) and generally lower than downgradient locations SD-17 and PZ-17RRR, suggesting that the culvert is not the source of these surface water impacts. A review of the available monitoring data does not suggest that surface water in the culvert has been impacted by surrounding soil.

Comment #10

Will the working documents during the design phase of remedial work be available for comment? WERC will have additional comments for the design phase. We hope to continue our working relationship as you move forward towards implementing the Action Alternatives adopted in your forthcoming Record of Decision.

EPA Response:

The RD plans and other documents submitted by Olin will be made available for WERC, Town officials, and other stakeholders to comment, similar to previous practice. Please see also EPA's responses to Comment #6 in **Section B** and Comment #1 in **Section C**, **II**, above, Comment #15 in **Section C**, **II**, below, and Comment #1 in **Section C, III,** below.

Comment #11

WERC requests an opportunity to discuss technical points with EPA in more detail prior to the issuance of the ROD.

EPA Response:

The NCP establishes the process that EPA must follow for the release of the Proposed Plan, the public comment period, and issuance of the ROD. Responses to oral and written comments received during the comment period are provided in the Responsiveness Summary of the ROD. These comments and responses become a part of the Administrative Record for the ROD in the event that the selected remedy is challenged. Once the ROD is issued, EPA will continue to discuss the technical points of its decision with interested parties during the design phase.

Comment #12

The premise and promise of the Superfund Program is the "Polluter Pays" principle. Olin has had 40 years to clean up the property at 51 Eames Street, and they have failed. Their only motivation now to implement additional clean-up activities is the anticipated sale of the property; their newfound cooperation to expedite certain aspects of additional groundwater investigations is driven by their desire to claim exemption from decontaminating our aquifer because they waited so long that the cost to do so will likely be astronomical. EPA should make the responsible parties pay all costs that were squandered by their failure to remediate OU3 (groundwater) upon confirming the presence of NDMA in 1990.

EPA Response:

EPA has a longstanding policy to pursue "enforcement first" throughout the Superfund cleanup process. This policy promotes the "polluter pays" principle and helps to conserve resources for the cleanup of sites where viable responsible parties do not exist. EPA guidance emphasizes that a major component of the "enforcement first" policy is that PRPs should conduct remedial actions whenever possible. See EPA's Memorandum, *Enforcement First for Remedial Action at Superfund Sites*, dated September 20, 2002 (available at: https://www.epa.gov/sites/production/files/documents/enffirst-mem.pdf). Following the issuance of the ROD, EPA will negotiate with the PRPs to enter into an agreement for the PRPs to perform the required response actions in accordance with Section 122 of CERCLA, 42 U.S.C. § 9622. If the parties are unable to reach agreement, EPA will consider other enforcement options. Please see also EPA's response to Comment #7 in **Section B**, above and Comment #2 in **Section C, IV**, below.

Comment #13

It's time for EPA to do everything possible *now* to require that all contamination be eliminated wherever possible, and that the concentrations are lowered to the largest degree possible where complete clean-up is not achievable. No half-measures – clean-up, not cover-up.

EPA Response:

EPA agrees that cleanup works needs to be initiated as soon as possible. The investigations at the Site have been ongoing for a very long time, with little progress in the actual cleanup. Strong efforts need to be made to hasten the pace of remedy design and implementation. Please see also EPA's responses to Comments #1, #3, and #16 in **Section B** and EPA's response to Comment #1 in **Section C, I**, above.

Comment #14

EPA should remove all contamination remaining at the Property and either consolidate within the Containment Area if the Containment Area is actually viable or treat it to safe standards. Contaminants of concern should not be left in place to "naturally attenuate" another 40-50 years. We don't want decades of additional monitoring, rather, a clean environment.

EPA Response:

During the FS, EPA considered several alternatives for remediation of the Site. For the soil contamination, EPA did consider removal and off-site disposal or consolidation within the Containment Area. These alternatives were not carried through the detailed analysis as they posed serious implementation issues. Please see EPA's responses to Comments #8 and #9 in **Section B**, above.

Comment #15

WERC is concerned that the group has not been included enough during development of the FS, Proposed Plan, and supporting documents.

EPA Response:

EPA has tried to keep WERC and other interested members of the public informed on the development of the FS, Proposed Plan, and supporting documents. Leading up to the issuance of the Proposed Plan, EPA met several times with representatives from WERC and discussed openly the status of work, the range of alternatives under development, the technical challenges posed by the Site, and many other issues. EPA provided the public an extended opportunity (10 days) for review of the Proposed Plan before the start of the comment period and conducted an extended formal comment period (60 days) for all parties to review the record. EPA remains committed to facilitating additional public input into the implementation of the remedy and will continue to discuss WERC's concerns as we move forward. Please see also EPA's response to Comment #1 in **Section C**, **II**, above and Comment #1 in **Section C, III,** below.

Comment #16

The Remedial Action Objectives (RAOs) for DAPL and groundwater hot spots are interim and fail to recognize the value of the aquifer as a public and private water supply. A long-term RAO must be included for the aquifer.

EPA Response:

The interim RAOs for DAPL and groundwater hot spots are intended to support the initiation of cleanup of the aquifer, designated as having a high use and value by MassDEP. EPA agrees that long-term RAOs are needed; EPA plans to develop and issue such RAOs as part of the final ROD, following completion of the data gaps work and final FS for groundwater (OU3). Please see also EPA's responses to Comment #1 and #14 in **Section B,** above.

Comment #17

The second RAO for surface water should be revised to remove the phrase "by a current or future trespasser."

EPA Response:

The second RAO for surface water states, "*Prevent migration of groundwater containing Site contaminants to Off-Property West Ditch Stream to prevent potential human exposure by a current or future trespasser to surface water containing Site contaminants at levels that pose an unacceptable risk."* EPA Guidance for drafting RAOs suggests that the RAO identify the risk posed and the receptor at risk. In the case of Off-Property West Ditch Stream, the risk is to current and future trespassers. It is unclear why the commenter requests that the wording, "*by a current or future trespasser,*" be deleted, as removal of this language will make the RAO vague and incomplete. As such, the language remains in the ROD.

Comment #18

Compliance with the surface water RAOs will be achieved by monitoring the water quality in surface water, not groundwater. Therefore, the RAO should include surface water objectives and not groundwater objectives. The following RAO should be added: "Restore surface water to ambient water quality criteria for the contaminants of concern."

EPA Response:

The first RAO for surface water states, *"Prevent migration of groundwater containing Site contaminants to East Ditch Stream, South Ditch Stream, and Off-Property West Ditch Stream to prevent exposure by current and future ecological receptors to surface water containing Site contaminants that would result in potential adverse impacts."* EPA notes that this ROD establishes National Recommended Water Quality Criteria (NRWQC) as the performance standards for surface water as these levels are protective of ecological receptors. EPA also notes that the selected remedy includes monitoring of the water quality in surface water to demonstrate that these standards have been achieved. However, EPA does not agree that an additional RAO – "Restore surface water to ambient water quality criteria for the contaminants of concern" is needed. The selected remedy achieves the objective of preventing the migration of contaminated groundwater to East, South, and Off-Property West Ditch Streams that would result in potential adverse impacts by preventing contaminated groundwater from impacting surface water, not by actively restoring the surface water. Therefore, EPA believes the RAOs in the Proposed Plan and ROD are sufficient.

Comment #19

The following RAO should be added for sediments: "Restore sediments to pre-release/background conditions to the extent feasible, at a minimum to levels that will result in self-sustaining benthic communities with diversity and structure."

EPA Response:

EPA acknowledges the commenter's intention and notes that the selected remedy will restore sediments to levels that are protective of the benthic community by removal and off-site disposal. The RAOs in this ROD for wetland soil and sediments are as follows:

- *Prevent exposure by current and future ecological receptors to wetland soil and sediments containing Site contaminants that would result in potential adverse impacts.*
- *Prevent the further migration of wetland soil and sediments containing Site contaminants to nearby wetlands, surface water, drainage features, and adjoining properties that would result in potential adverse impacts.*

This ROD also establishes cleanup levels for sediments that will result in the re-establishment of the benthic community. Therefore, EPA does not agree that revisions to the RAOs for sediments are needed.

Comment #20

WERC has little trust in the future owner/operator adhering to Institutional Control requirements, so contamination should be cleaned up rather than covered or left in place with monitoring.

EPA Response:

Part 2, **Section E.3**, **SITE CHARACTERISTICS,** Principal Threat Waste, above, of this ROD explains that the soil impacted with chromium and BEHP on the Property is considered to be low-level threat waste that will be addressed under the selected remedy by installing a permanent, low-permeability cap over the Containment Area and installing soil and/or asphalt cover systems over contaminated upland soil. The Containment Area cap and upland soil cover systems will prevent unacceptable exposure by ecological receptors and unacceptable leaching of Site contaminants in the Containment Area. Institutional Controls and long-term maintenance of covers and caps will be used to address these materials over the long-term. Further, under the selected final remedy for soil and sediments, additional evaluations and/or implementation of engineering controls such as vapor barriers or sub-slab depressurization systems (SSDSs) will be required for new building construction or building alterations on the Property to address potential vapor intrusion risks to indoor workers from TMPs.

Institutional Controls are non-engineered instruments such as administrative and legal controls in the form of land use restrictions that help minimize the potential for human or ecological exposure to contamination and/or protect the integrity of the remedy. The details of the Institutional Controls required by this ROD will be resolved during the pre-design and RD phase in coordination with the parties performing the remedial action, impacted landowners, local officials, and MassDEP. Institutional Controls may be implemented through measures that may include, but are not limited to, Notice of Activity and Use Limitation (NAUL), Grant of Environmental Restriction and Easement (GERE), town ordinance, advisories, building permit requirements, and other administrative controls.

Institutional Controls for, and long-term maintenance of, upland soil covers, the Containment Area cap, and any implemented vapor barriers or SSDSs will ensure the protectiveness of these remedial activities over the long term. In addition, EPA will continue to evaluate Site conditions and the effectiveness of implemented Institutional Controls through its Five Year Reviews to

ensure the remedy remains protective of human health and the environment. To facilitate future use and redevelopment of the Property consistent with the cleanup, Institutional Controls will also be established to appropriately manage impacted soil, soil vapor, and groundwater encountered during future intrusive activities (*e.g.*, installing subsurface utilities, building foundations/slabs, etc.) to protect human health and the environment. In the event that a future land owner or developer fails to comply with the Institutional Controls, EPA and the state can take enforcement actions requiring compliance.

Comment #21

Consolidation of the cleanup components does not promote public understanding of the interrelationships between the various cleanup components and does not allow for optimization. The alternatives should be decoupled for ease in evaluation.

EPA Response:

EPA considered several methods to develop remedial alternatives, but ultimately selected bundling alternatives because some of the alternatives are interrelated and needed to be combined to be appropriately protective. Additionally, due to the large number (34) and complexity of the remedial alternatives considered in Volumes I and II of the FS report for the eight cleanup components – DAPL, groundwater hot spots, LNAPL, surface water, Containment Area soil, upland soil, wetland soil and sediments, and TMPs in soil – EPA sought to simplify and consolidate the cleanup components to promote public understanding of the interrelationship between the various cleanup components and to reduce the number and extent of comparative analyses required. See *FS Report Volume III* (USEPA, 2020c) for further discussion on the rationale for consolidating the cleanup components.

The eight original cleanup components were grouped by media, which resulted in the linking of DAPL with groundwater hot spots for the development of a set of alternatives for an interim action to address the major sources of contamination in OU3. For the final action for OU1 and OU2, LNAPL was coupled with surface water, because of the inherent potential impacts to East Ditch Stream surface water from LNAPL contamination and the prudence of developing a consistent approach to addressing all surface water contamination at the Site. Further, all of the soil and sediment alternatives (Containment Area soil, upland soil, wetland soil and sediments, and TMPs in soil) were bundled together in consideration of their interrelated nature and to facilitate the development of a set of alternatives to address contamination on and in the immediate environs of the Property.

Comment #22

WERC prefers Alternative GWHS-4 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **1,100 ng/L** NDMA (approx. 12 wells), on-site treatment at new treatment system – rather than Alternative GWHS-3 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **5,000 ng/L** NDMA (approx. 6 wells), on-site treatment at new treatment system – which was listed as the preferred alternative component in the Proposed Plan, for the following reasons: it includes more mass removal; does more to prevent further NDMA migration into the aquifer and bedrock, making

final cleanup more feasible; similar implementation to the selected alternative (Alternative GWHS-3); target concentration is still two orders of magnitude above the target cleanup level for NDMA; marginal cost increase of 14% present worth; construction time and time to achieve RAOs is the same as Alternative GWHS-3; and better achieves RAOs.

EPA Response:

Understood. Please see EPA's response to Comment #3 in **Section B**, above.

Comment #23

The groundwater hot spot alternatives GWHS-2 through GWHS-4 include new prohibitions on the use of groundwater in the OU3 study area unless demonstrated that it will not pose an unacceptable risk, cause further plume migration, or interfere with the remedy. Given these prohibitions, will residents and property owners be provided with water to replace their well water?

EPA Response:

Residential well water within the OU3 study area is tested quarterly to evaluate the potential risk posed. If residents and property owners within the study area are not already in the quarterly sampling program, they are welcome to reach out to EPA to discuss their potential risk and whether sampling of their well is warranted. If sampling indicates a potential unacceptable risk, residents and other users may be connected to existing or planned water lines. At this time, Olin is providing bottled water and water coolers to two residences and working cooperatively with the Town of Wilmington to extend a water line to these residences. Other properties in the area already have a water line nearby for connection. If a new well is planned, EPA will work with the Town of Wilmington to ensure that the well does not have the potential to cause adverse impacts to health or to the groundwater remedy.

Comment #24

WERC considers Alternative DAPL/GWHS-4 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **1,100 ng/L** NDMA (approx. 12 wells), on-site treatment at new treatment system – to be more effective than the selected alternative (Alternative DAPL/GWHS-3 – targeting **5,000 ng/L** NDMA) because it will remove more source material sooner. Each delay in removal of source material results in more contamination migrating to bedrock, where it is much more difficult to remove or treat.

EPA Response:

Understood. Please see EPA's response to Comment #3 in **Section B**, above.

Comment #25

WERC disagrees with EPA's rating of Alternative DAPL/GWHS-4 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **1,100 ng/L** NDMA (approx. 12 wells), on-site treatment at new treatment system – as "fair" and Alternative DAPL/GWHS-3 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **5,000 ng/L** NDMA (approx. 6 wells), on-site treatment

at new treatment system – as "good" for short-term effectiveness given that risks to the community are modest and can be minimized with best management practices. The groundwater extraction well placements for Alternatives DAPL/GWHS-4 and -3 are similar.

EPA Response:

While the location of the groundwater extraction wells are generally similar for the two alternatives, Alternative DAPL/GWHS-4 incorporates one extraction well approximately 400 ft further into the MMB wetlands. This may have significant temporary impacts on the wetland during construction of the extraction well and associated pipeline. Furthermore, two additional extraction wells are located on commercial properties and have some additional administrative and potentially operational impacts. Finally, while best management practices will be used to minimize impacts, the potential for impacts is larger in general for alternatives with more infrastructure. Therefore, EPA still supports the original ratings for short-term effectiveness of "good" for Alternative DAPL/GWHS-3 and "fair" for Alternative DAPL/GWHS-4.

Comment #26

WERC disagrees with EPA's rating of Alternative DAPL/GWHS-4 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **1,100 ng/L** NDMA (approx. 12 wells), on-site treatment at new treatment system – as "fair" and Alternative DAPL/GWHS-3 – DAPL extraction (approx. 20 wells), groundwater hot spot extraction targeting **5,000 ng/L** NDMA (approx. 6 wells), on-site treatment at new treatment system – as "good" for implementability, and considers the alternatives to be the same, with the exception that the ease of implementing future remedial actions is considered to be better for Alternative DAPL/GWHS-4.

EPA Response:

The installation of an additional extraction well and associated infrastructure much further into the MMB wetlands as part of Alternative DAPL/GWHS-4 poses significant logistical challenges: all construction and maintenance would need to be tailored to minimize environmental impacts to a significant wetland resource, but at the same time, physical access to this area is challenging because of the soft ground and shallow water (that prevents use of water craft such as a barge). The additional wells outside of the MMB wetlands under Alternative DAPL/GWHS-4 also add some complexity to the design and operation of the extraction system. EPA acknowledges that a more aggressive approach earlier in the process may assist with later groundwater remediation, but considers that overall, Alternative DAPL/GWHS-4 is somewhat less implementable than Alternative DAPL/GWHS-3.

Comment #27

For LNAPL and surface water, WERC agrees with the selection of Individual Cleanup Component LNAPL-5 – continued operation of Plant B to capture and treat LNAPL, followed by Plant B demolition and expanded Multi-Phase Extraction (MPE) – but would prefer to pair this with surface water Individual Cleanup Component SW-3 – groundwater extraction and treatment – which has more extensive

groundwater extraction because this combination of alternatives for LNAPL and surface water would better achieve RAOs. The cost of this alternative is unknown.

EPA Response:

Individual Cleanup Component SW-4 – targeted groundwater extraction and treatment – was included in the selected remedy because it included groundwater extraction and treatment at the identified source areas for potential groundwater impacts to surface water: the Plant B area, groundwater that may have been impacted by the Jewel Drive and Containment Area DAPL pools, and areas of elevated groundwater contamination that may be migrating from the industrial area in the northern portion of the Property. At the same time, this Individual Cleanup Component minimized the potential impacts on wetland areas to the south and southeast of the Containment Area. As provided in Section 4.5.2.7 (Individual Cleanup Component SW-3) and Section 4.5.3.7 (Individual Cleanup Component SW-4) of the *FS Report Volume I* (Olin, 2020a), the net present worth (NPW) of Individual Cleanup Component SW-3 was estimated to be approximately $8.8 million compared to approximately $5.0 million for Individual Cleanup Component SW-4. Given the other factors listed above and the cost difference, EPA retained Individual Cleanup Component SW-4. Note that the final configuration of groundwater extraction wells will be determined based on PDI results, subject to EPA's review and approval.

Comment #28

A new alternative for the Containment Area should be developed that includes excavation of all soil above PRGs.

EPA Response:

Please see EPA's response to Comment #8 in **Section B**, above.

Comment #29

WERC disagrees with EPA's selection of Individual Cleanup Component SOIL-2 – soil covers – for upland soil and does not consider Institutional Controls to be sufficient to address soil, given that compliance would be left to future property owners/operators. Following the National Institute for Occupational Safety and Health (NIOSH) and EPA's waste management hierarchy, Institutional Controls should be a solution of last resort.

EPA Response:

EPA has considered the reasonably anticipated future land use of the Property—in light of its industrial history and its location in a commercial/industrial area—in selecting Institutional Controls as a component of the remedy to ensure the prohibition of residential use. Soil covers will restrict access for ecological receptors. Please see also EPA's responses to Comment #6 in **Section B** and Comment #20 in **Section C, II**, above.

Comment #30

WERC disagrees with EPA's selection of Individual Component TMP-2 – limited action (Institutional Controls, including vapor intrusion evaluations or vapor barriers and/or SSDSs – for TMPs in Soil and prefers to see treatment or excavation of TMP-impacted soil.

EPA Response:

TMPs pose potential human health risks on the Property via the subsurface-to-indoor vapor intrusion pathway in future occupied buildings. Vapor intrusion risks are commonly and reliably mitigated in new construction by including vapor barriers and sub-slab ventilation systems, which can be readily incorporated into new building designs.

Comment #31

Soil data for the Containment Area have not been presented in a timely fashion to make an informed decision about this area, and the monitoring results were not compared to the upland soil PRGs.

EPA Response:

EPA does not consider the assessment of Containment Area soil to date to be comprehensive (please see EPA's response to Comment #4 in **Section C**, **I**, above) and acknowledges the time constraints for analyzing the data produced by the November 2019 Containment Area soil investigation prior to drafting RAOs for Site media. Results from the November 2019 Containment Area soil investigation were transmitted from Olin to EPA on March 20, 2020 and shared with WERC on March 23, 2020. The principal purpose of the 2019 investigation was to better define the requirements of the remedial action selected by EPA, specifically the requirements under RCRA by which the wastes within the Containment Area would need to be remediated, contained, and monitored for the foreseeable future. The 2019 investigation did not indicate that soil within the Containment Area exhibited toxicity characteristics as defined by RCRA (40 C.F.R. § 261.24(a)).

The PRGs established in the feasibility study for TMPs, BEHP, and chromium for upland soil and Containment Area soil assume that a complete risk pathway is present, meaning birds were feeding in the area and thus in direct contact with the contaminated soil. At the time of the issuance of this ROD, Containment Area soil is overlain by a temporary cover that theoretically prevents water infiltration and also disrupts the primary risk pathway for ecological receptors. Considering the results of the 2019 investigation, historical disposal practices, and analytical data produced by the RIs for the Site, EPA determined that a multi-layer, low-permeability cap compliant with RCRA Subtitle D and Massachusetts solid waste landfill performance standards would be necessary to address the risks posed by Containment Area soil. Specifically, the low-permeability cap preferred by EPA would further prevent leaching of Site contaminants associated with the Containment Area into groundwater, surface water, and sediments at levels that pose unacceptable risks to human health and the environment. Although soil results from the Containment Area were not compared to the upland soil PRGs – which were established based on ecological exposures and risks – the low-permeability cap in the Containment Area would also address these risks, should they exist, by eliminating the exposure pathway.

Comment #32

The Containment Area does not adequately control groundwater. While the proposed cap would prevent contact with soil, it would not prevent the continued migration of groundwater into the Containment Area from the north and the migration of groundwater out of the Containment Area to the south. Because the OU3 (groundwater) FS will be completed in the future, any decision regarding the Containment Area is premature at this time.

EPA Response:

EPA agrees that the current temporary cap is inadequate, that shallow groundwater migrates out of the Containment Area via the equalization window, and that there appears to be some degree of groundwater leakage elsewhere from the Containment Area at the interface between the slurry wall and bedrock surface. As discussed in EPA's response to Comment #4 in **Section C**, **I**, above, it is important to note that the Containment Area contains both solid waste material that poses a threat of leaching contaminants into groundwater, and DAPL, a liquid that can flow and similarly leaches contaminants into groundwater. The selected remedy includes the installation of a low-permeability cap over the Containment Area and closure of the equalization window to reduce the infiltration of water into this area and minimize leaching of contaminants from the solid waste and soil into groundwater. The selected remedy also includes the extraction of DAPL within the Containment Area to remove this material as a source of contaminants to groundwater.

Collectively, these activities are intended to control the sources of groundwater contamination in this area; they are not intended to result in restoration of the aquifer. Further investigations and an FS are needed to understand the full nature and extent of groundwater contamination and to evaluate alternatives for restoration of the aquifer. It is common practice in the Superfund cleanup process to start cleanup of a site by first selecting remedies that control the sources of contamination, followed by selecting remedies that achieve all the cleanup goals for the site. Therefore, EPA does not agree that selection of the source control activities for the Containment Area is premature. Once again, further alternatives will be evaluated as part of OU3 (groundwater) to further address groundwater contamination migrating from this area.

Comment #33

EPA needs to decide if the Containment Area truly restricts groundwater flow. If it does, then contaminated soils and sediments from elsewhere at the Site should be added before installing a cap. If not, then the contaminated soils above PRGs should be removed and clean fill added, without adding a cap.

EPA Response:

As noted previously in EPA's responses to Comment #5 in **Section B**, Comment #4 in **Section C**, **I**, and Comment #31 in **Section C, II**, above, EPA does not believe that the Containment Area, with its current temporary cap and slurry wall, is protective enough for the issues posed by this area of the Site. The Containment Area contains solid wastes that can leach contaminants and act as on ongoing source of contaminants to the aquifer. The area also contains DAPL that can

migrate into bedrock fractures and act as on ongoing source of contamination to the aquifer. EPA's remedy involves closing the equalization window, capping the solid waste with a low-permeability cover to minimize infiltration, and extracting DAPL. These actions serve as source control measures to minimize ongoing impacts to groundwater.

The upland soil located outside of the Containment Area poses a different kind of risk. These upland soils pose ecological risks to birds feeding in the area. As such, these risks can be managed with different types of cover systems, such as clean soil or pavement. The upland soil does not pose a threat of leaching contaminants to the aquifer and as such does not require management via a low-permeability cover. Consolidation of contaminated upland soil within the Containment Area and under the low-permeability cap was considered by EPA (please see EPA's response to Comment #9 in **Section B**, above); however, the volume of soil requiring excavation and consolidation would likely cause capacity issues within the Containment Area.

III. Written comments submitted by the Town of Wilmington (Board of Selectmen and GeoInsight, Inc.) on October 22, 2020

Comment #1

Wilmington residents and their Town government did not cause or contribute to the contamination of the Property, private residential and commercial properties, a major aquifer and five of the Town's nine drinking water wells. Nor were they in a position to manager or mitigate that contamination, other than commenting on technical reports and work plans. Therefore, the Town of Wilmington should be afforded ample opportunity to contribute to decision-making concerning the selection and scope of plans to remediate that contamination.

EPA Response:

Part 2, **Section C**, **COMMUNITY PARTICIPATION**, above, of this ROD explains that EPA made significant efforts to keep Town of Wilmington officials, WERC, and other interested members of the public informed with regards to the development of the FS, Proposed Plan, and supporting documents leading up to the issuance of the Proposed Plan. EPA provided the public an extended opportunity (10 days) for review of the Proposed Plan before the start of the formal comment period, and also conducted an extended formal comment period (60 days) for all parties to review the record and provide comments. Please see also EPA's response to Comments #1, #10, and #15 in **Section C**, **II**, above.

EPA is required by statute to hold a formal public comment period to receive comment on its identified range of proposed cleanup approaches and its preferred alternative published in the Proposed Plan. EPA considers and uses these comments to improve the cleanup approach ultimately selected. In the Superfund process, the formal comment period on cleanup alternatives is concluded and a cleanup plan is selected and documented in the ROD before the engineering design phase can start. Although a formal public comment period is not held during any portion of the engineering design phase, EPA incorporates opportunities for public involvement as it proceeds with the implementation of the cleanup plan. EPA will seek the input of Town officials and WERC in design planning such as addressing soil and sediment erosion controls; flood,

wetland, and stormwater management; traffic and construction management; and health and safety. As design progresses, EPA will issue several design documents (such as a 30% design, 60% design, and 100% design), outlining construction and monitoring plans in detail. These design documents will be shared with Town officials, WERC, the public, and other interested parties. Likely mechanisms for sharing engineering design information include posting design documents on the Site webpage and the EPA contractor's fileshare webpage, making them available at the information repositories, distributing e-mail updates, a Site fact sheet, and community mailers highlighting the design information, and holding public informational meetings. In addition, EPA will coordinate closely with residents who reside on potentially impacted properties. EPA remains committed to facilitating additional public input into the implementation of the remedy and will continue to discuss the Town's and public's concerns as we move forward.

Comment #2

Remediation should make good on the original goal of restoring the Ipswich Watershed and Aberjona Watershed and the Town of Wilmington's drinking water resources.

EPA Response:

Please see EPA's responses to Comments #1 and #3 in **Section B,** above.

Comment #3

Remedial measures should be sufficient to withstand any potential redevelopment and not be compromised by cost concerns.

EPA Response:

EPA will continue to provide oversight to ensure that redevelopment does not adversely impact the construction and operation of the selected remedy for the Site and EPA's efforts to collect more data as needed to select and implement a final remedy for groundwater (OU3). If redevelopment occurs, EPA will review any redevelopment plans to ensure that the portion of the Site under consideration for redevelopment is safe for the intended use. Please see also EPA's response to Comments #2 and #17 in **Section B,** above.

EPA is required by statute and regulation to consider cost in the Superfund remedy selection process. Please see EPA's response to Comment #7 in **Section B** and Comment #12 in **Section C, II**, above.

Comment #4

The Town is concerned that the Containment Area slurry wall may not have been installed properly, that the slurry wall's integrity is suspect, and that it has allowed the migration of DAPL contaminants to surrounding media and off-site. While the Town's preference would be complete cleanup and full remediation, the Town recognizes that a substantial and secure cap could be a valid method. The Town

urges EPA to rigorously re-evaluate the cap and extraction measures at the Containment Area at each Five Year Review, or more frequently, once installed.

EPA Response:

The original intent of the slurry wall was to cut off the migration of contamination and contain the DAPL within the boundaries of the Olin Property (Property). However, this effort was not successful. The DAPL pooled beneath the Property (the On-Property DAPL Pool) migrated via gravity flow over time into a lower depression to the west and formed the Jewel Drive DAPL Pool. When the second depression filled, DAPL migrated into a third depression creating the Main Street DAPL Pool. The extent of DAPL beyond these pools is currently unknown and will be investigated further during the OU3 RI.

EPA agrees with the commenter that the current temporary cap is inadequate for the purposes of reducing or eliminating the movement of Site contaminants. EPA's selected remedy for the Containment Area addresses the issue of the open equalization window within the slurry wall, which may contribute to the inability of the current Containment Area design to adequately contain Site contaminants. EPA is also of the opinion that there appears to be some degree of groundwater leakage elsewhere from the Containment Area at the interface between the slurry wall and bedrock surface (see EPA's response to Comment #32 in **Section C, II**, above). Irrespective of the root cause of the observed leakage through the slurry wall, EPA's selected remedy of a permanent cap for the Containment Area addresses the threat of leaching of Site contaminants associated with the Containment Area into groundwater, surface water, and sediments at levels that pose unacceptable risks to human health and the environment. More importantly, EPA's selected interim remedy for DAPL and hot spot groundwater includes extraction wells both inside and outside of the Containment Area slurry wall. The extraction network is the primary mechanism to address the liquid waste (e.g. DAPL and contaminated groundwater) in this area which is acting as a continuous source. The use of this extraction network minimizes the issues associated with the possible leakage occuring through the slurry wall.

At the conclusion of the remedy construction, hazardous substances, pollutants, or contaminants will remain at the Site. Therefore, as required by law, EPA will review the Site remedy to ensure that the remedial action continues to protect human health and the environment at least once every five years as part of the Agency's Five Year Reviews for the entire Site. These Five Year Reviews will evaluate all of the components of the Site remedy for as long as contaminated media above CERCLA risk levels remain in place.

Comment #5

The Town recognizes that the proposed 5,000 ng/L NDMA target for groundwater hot spot extraction is associated with an interim action and that a lower concentration target is expected to be adopted in the future. EPA should re-evaluate the need for a far lower target level as it develops final remedial plans.

EPA Response:

Please see EPA's response to Comment #3 in **Section B**, above.

Comment #6

The proposed cleanup plan may result in a net loss of water from the Ipswich Watershed and depletion of groundwater in the MMB aquifer, which is mostly located in the Ipswich Watershed. The treatment system design should therefore include mechanisms to mitigate or minimize potential groundwater depletion in the MMB aquifer. EPA should require that the extraction, treatment, and discharge of treated groundwater should be designed and implemented, as much as practicable, in order to minimize the transfer of groundwater between the Ipswich and Aberjona watersheds.

EPA Response:

Generally, treated groundwater should be returned to the watershed from which it was withdrawn to the extent feasible. Years of data collected from the Site demonstrate that the water table across the impacted area is typically flat, with frequent groundwater mixing between the Ipswich and Aberjona River watersheds. This Site-specific hydrologic information indicated that the impacts of groundwater withdrawal will likely not have a significant effect on the MMB aquifer. However, the impacts of extraction and discharge of groundwater will be evaluated further during design and the design will be based on an approach that minimizes adverse impacts. In addition, once the remedy is operational, continued monitoring will occur to demonstrate that the system is not resulting in adverse impacts to either watershed. Please see also EPA's response to Comment #4 in **Section B**, above.

Comment #7

Wilmington is prepared to cooperate with EPA to develop and implement appropriate restrictions on use of private wells in areas specifically impacted by Site contamination. However, EPA should more specifically identify the nature, scope, and geographic areas for bylaws or other locally-imposed restrictions or conditions on residential or industrial water usage and/or construction of wells. Details regarding these restrictions should be included in the ROD.

EPA Response:

EPA will work closely with the Town of Wilmington on the development of Institutional Controls for limiting the use of groundwater either through the passage of an ordinance, an amendment to local bylaws, or the establishment of procedures. This ROD contains information on the nature, scope, and geographic area where the restrictions should apply (see **Figure 11** in **Appendix C** of this ROD). EPA will periodically review the Institutional Controls for the groundwater, at a minimum every five years, to make sure that they are effective and cover the appropriate area as more information about the extent of contamination is developed. Please see also EPA's response to Comment #6 in **Section B**, above.

Comment #8

The interim target groundwater concentration that was developed (5,000 ng/L) is several orders of magnitude above concentrations that are protective of human health and the environment. The final

cleanup plan for groundwater should include a target cleanup goal for NDMA that is significantly lower than the interim action goal of 5,000 ng/L; expansion of the groundwater extraction system to remediate areas where NDMA concentrations are below 5,000 ng/L; remediation of groundwater to concentrations that do not present a risk to human health or the environment for unrestricted uses; and restoration of the MMB aquifer to meet drinking water standards.

EPA Response:

Please see EPA's responses to Comments #1 and #3 in **Section B**, above.

Comment #9

The interim groundwater extraction and treatment system should be designed so that it can be readily expanded to receive additional DAPL and/or contaminated groundwater. The system design should include: oversized liquid conveyance piping diameter to accommodate potential increases in liquid flow; installation of spare piping in trenches for potential future use; adding valves or appurtenances to the piping so that additional extraction wells can be installed in the future; and designing a treatment system with sufficient excess capacity to accommodate potential increases in flow rate.

EPA Response:

EPA agrees with the comment. The potential for capacity expansion will be considered during review of the PDI and RD documents.

Comment #10

EPA's preferred alternative for LNAPL and surface water in the Proposed Plan is LNAPL/SW-3 – Demolition of Plant B, MPE for LNAPL, Targeted Groundwater Extraction to Prevent Impacts to Surface Water, Treatment at New Treatment System(s). This approach is not expected to be effective in achieving cleanup goals and a different remedial alternative should be considered for LNAPL. The LNAPL has been described as "#415 Process Oil" and process oil that contains BEHP, NDPhA, and TMPs. This LNAPL is considered to be a highly viscous oil that is relatively immobile. LNAPL mobility tests have not been conducted, but the LNAPL appears to have remained in the same approximate area where it was originally identified and does not appear to be migrating. LNAPL recovery rates have been very low and LNAPL remains despite nearly 40 years of active remediation. This indicates that the LNAPL is not sufficiently mobile to be recovered by MPE. EPA should consider an alternative approach that combines Individual Cleanup Component LNAPL-6 (excavation and off-site disposal) with Individual Cleanup Component SW-3 (groundwater extraction and treatment). This approach would remove the LNAPL directly and allow groundwater extraction wells to be installed directly in the excavation prior to backfill.

EPA Response:

EPA's preferred alternative for LNAPL and surface water – Alternative LNAPL/SW-3 – includes MPE for the treatment of LNAPL. MPE and excavation were among a set of alternatives evaluated to address LNAPL contamination near Plant B in the *Interim Action Feasibility Study* (*FS Report Volume II;* Olin, 2020b) and *Volume III – Comparative Analyses, Feasibility Study*

Report, Olin Chemical Superfund Site, Wilmington, Massachusetts (FS Report Volume III, USEPA, 2020c). Please see also EPA's response to Comment #8 in **Section C, I**, above.

EPA disagrees with the commenter's position that MPE will not be effective in achieving the cleanup goals, and that LNAPL is not sufficiently mobile to be recovered by MPE. LNAPL remediation over the history of the Site has been passive – limited to removal by hand via skimmers or absorbent bailers – and while current recovery volumes are low, they demonstrate some degree of mobility. LNAPL was first detected as oily seepage into East Ditch Stream, and has remained in the same general area since its release because of the lack of a significant hydraulic gradient due to groundwater extraction by Plant B. LNAPL that is inherently mobile is not expected to migrate when a negligible groundwater gradient is present. Additionally, remediation efforts were limited in the past by the presence of the Plant B building, which will be demolished under the selected remedy to facilitate access to the entire LNAPL-contamination area. MPE is a more robust remedy than passive removal of LNAPL, and its implementation will include PDIs and testing. Under the selected remedy, the geographical extent of LNAPL will be further delineated via additional sampling and the LNAPL will be further characterized, including evaluations of LNAPL mobility. PDI data will be used to develop operating parameters and to calibrate the MPE system.

As the MPE remedy becomes operational, EPA will closely monitor its progress to ensure that the system is functioning as intended and working to meet the RAOs of preventing migration of LNAPL to East Ditch Stream and removing LNAPL that represents a source of Site contaminants to groundwater and a source of TMPs to indoor air in future building construction. EPA's selected remedy also includes groundwater extraction and treatment to prevent impacts to surface water.

For the reasons described above, excavation of LNAPL-impacted soil would only be slightly more effective in the long term than MPE. However, MPE provides for more reduction of contaminant toxicity, mobility, or volume than excavation, as EPA's Selected Alternative LNAPL/SW-3 will utilize an estimated three to five MPE wells to capture and treat soil vapor and groundwater, and only limited reduction of pollutant mobility would occur during excavation through the addition of bulking agents to facilitate off-site disposal. Both alternatives would be protective of human health and the environment and would meet ARARs. Both alternatives would remediate LNAPL in approximately one year, but excavation has greater short-term impacts in terms of worker and community health and safety issues due to risks associated LNAPL volatilization during excavation and trucking LNAPL-contaminated soil through the community for off-site disposal. Moreover, MPE is easier to implement than excavation because excavation would interfere with existing extraction and/or monitoring wells on the Property, and if additional LNAPL-impacted soil is encountered during excavation activities, removing those impacts would be difficult due to potential encroachment on the active Massachusetts Bay Transportation Authority (MBTA) railroad line and sheet piling along the bank of East Ditch Stream may also be necessary. The costs of MPE are proportional to its overall effectiveness, and it is therefore cost effective.

Additionally, as required by law, EPA will review the Site remedy, including the MPE remedy for LNAPL, to ensure that the remedial action continues to protect human health and the

environment at least once every five years as part of the Agency's Five Year Reviews for the entire Site as long as hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use. These Five Year Reviews will evaluate all of the components of the Site remedy for as long as contaminated media above CERCLA risk levels remain in place.

Comment #11

EPA's proposed alternative to install a permanent cap over the Containment Area is expected to adequately address residual impacts and achieve RAOs. However, Olin's investigations in the Containment Area were limited and may be insufficient to adequately assess remaining impacts.

EPA Response:

EPA agrees that the investigations within the Containment Area were limited and may not completely characterize all Containment Area soil. This area has been reworked several times during the history of the Site and during previous response actions. As such, the area would need a more robust sampling program to demonstrate that the soils in this area do not pose a leaching threat to groundwater. Please see also EPA's response to Comment #4 in **Section C, I**, above.

Comment #12

A significant amount of information will be collected regarding DAPL and groundwater impacts from the ongoing data gaps investigation. The Town and its contractor expect a final cleanup plan for OU3 after the data gaps work is completed and expect to review and comment on that document.

EPA Response:

Comment noted. Please see also EPA's response to Comment #10 in **Section C, II**, above.

IV. Written comments submitted by residents on October 26 & 27, 2020

Comment #1 (C. Baima, J. Baima)

The plan for the remedial action should involve cleaning rather than covering contamination.

EPA Response:

Portions of the selected remedy do consist of removal of contamination (the interim remedies for DAPL and groundwater hot spots; and the final remedy for wetland soil and sediments) based on a full evaluation that includes feasibility, cost, as well as effectiveness. Removal of all other impacted soil has a high degree of permanency relative to the other alternatives evaluated, however, EPA considered other factors as outlined in Superfund guidance. Excavation of all impacted soil requires significant effort to manage, consolidate, dewater, and transport material, and also results in more potential short-term impacts to workers and neighboring areas from this work. In addition, excavation near the eastern boundary of the Olin property (Property) may

require additional structural support close to the MBTA railroad tracks, which poses significant structural, logistical, and safety challenges given that this is an active commuter rail line.

The engineering controls for the soils remaining in place under the selected remedy – capping and cover systems, installation of soil vapor barriers and other vapor mitigation systems for potential future buildings – are reliable and widely-accepted technologies. Given that the Property is zoned for industrial use and that soil impacts are generally limited to the Property or immediately adjacent to the Property boundary, EPA considers engineering controls and Institutional Controls to be adequately reliable for the soil contamination remaining in place under the selected remedy. As part of the selected remedy, Five Year Reviews will be required for as long as contamination remains in place at concentrations above residential criteria, and these reviews will evaluate the engineering controls and Institutional Controls in place to ensure their adequacy. Please see also EPA's responses to Comment #8 in **Section B** and Comments #14 and #20 in **Section C, II**, above.

Comment #2 (C. Baima, J. Baima)

What is the possible impact on the planned interim or final activities in the case of bankruptcy or change in ownership for Olin or other prior or future owners? The various owners of the Olin Site should not be excused from their environmental, social and fiscal responsibilities.

EPA Response:

Under CERCLA, the classes of liable parties include current owners and operators of a facility and past owners and operators of a facility at the time of disposal of hazardous substances. **Part 2**, **Section B.3**, **SITE HISTORY AND ENFORCEMENT ACTIVITIES**, History of CERCLA Enforcement Activities, above, of this ROD explains that as a result of Site PRP search activities, EPA issued notices of potential liability to several PRPs, including American Biltrite, Inc., Biltrite Corp., Olin, Stepan Company, Fisons Limited, and NOR-AM Agro LLC. These parties either owned or operated the Facility at a time when hazardous substances were disposed or are a successor to an entity that was the owner or operator of the Facility at a time of disposal of hazardous substances. Olin is the current owner and operator of the Facility. Pursuant to an Administrative Settlement Agreement and Order on Consent (AOC), Olin, American Biltrite, Inc., and Stepan Company have been performing the RI/FS with EPA oversight, which is still on-going for Site-wide groundwater. Therefore, EPA has identified a number of parties that it believes are responsible for the contamination at the Site and expects that these parties will pay for/perform the cleanup.

CERCLA liability is joint and several, which means that any one PRP may be held liable for the entire cleanup of a site. Therefore, if Olin or any of the other PRPs are unable to fulfill their cleanup obligations at the Site, the other PRPs would be required to satisfy the obligations. Additionally, EPA negotiates financial assurance requirements in its Superfund settlements and imposes financial requirements on PRPs through orders. In general, financial assurance provisions in settlements and orders require PRPs to demonstrate that adequate financial resources are available to complete required cleanup work.

CERCLA was amended in 2002 to allow certain parties who purchase contaminated properties to buy such properties and avoid potential CERCLA liability if they qualify as a "bona fide

prospective purchaser" ("BFPP"). The BFPP provision provides that a person meeting the criteria of CERCLA Sections 101(40) and 107(r)(1) and who purchases after January 11, 2002 is protected from CERCLA liability and will not be liable as an owner or operator under CERCLA. To meet the statutory criteria for a BFPP, a landowner must satisfy certain threshold criteria and continuing obligations. Among other continuing obligations, a BFPP must do the following: (i) provide full cooperation, assistance, and access to persons that are authorized to conduct response actions at the site; (ii) take reasonable steps to stop any continuing release; prevent any threatened future release; and prevent or limit human, environmental, or natural resource exposure to any previously released hazardous substance; and (iii) establish that it is in compliance with any land use restrictions established or relied on in connection with the cleanup, and it does not impede the effectiveness or integrity of any Institutional Control employed in connection with the cleanup. Landowners must comply with land use restrictions and implement Institutional Controls even if the restrictions or Institutional Controls were not in place at the time the person purchased the property. Therefore, any future owners of the Olin property will be required to meet these requirements in order to maintain BFPP status. Please see also EPA's response to Comment #20 in **Section C, II**, above.

Comment #3 (C. Baima)

If the Containment Area is working as intended, contaminated material should be consolidated within it prior to capping. If not, it should be fixed prior to capping or the soils should be removed. If the status of the cap is unknown, a remedy should not be selected at this time.

EPA Response:

Please see EPA's responses to Comments #8 and #9 in **Section B**, above, Comment #4 in **Section C, I**, above, and Comments #14 and #32 in **Section C, II**, above.

Comment #4 (C. Baima)

Cost should not be a criterion for the selection of alternatives.

EPA Response:

Please see EPA's response to Comment #7 in **Section B**, above.

Comment #5 (C. Baima)

Remedial alternatives should be selected based on the expectation of restoration of soil and water to pre-contamination conditions and in the shortest possible timeframe. The goal for groundwater is to restore the aquifer to drinking water conditions.

EPA Response:

EPA's May 25, 1995 directive entitled, *Land Use in the CERCLA Remedy Selection Process* (available at: https://www.epa.gov/sites/production/files/documents/landuse.pdf) provides information for considering land use in remedy selection decisions. Major points of this directive include the following:

- *Discussions with local land use planning authorities, appropriate officials, and the public, as appropriate, should be conducted as early as possible in the scoping phase of the Remedial Investigation/Feasibility Study (RI/FS). This will assist EPA in understanding the reasonably anticipated future uses of the land on which the Superfund site is located;*
- *Remedial action objectives developed during the RI/FS should reflect the reasonably anticipated future land use or uses; and*
- *Future land use assumptions allow the baseline risk assessment and the feasibility study to be focused on developing practicable and cost effective remedial alternatives. These alternatives should lead to site activities which are consistent with the reasonably anticipated future land use.*

The Olin property (Property) is zoned for commercial/industrial use; EPA's understanding from discussions with Town of Wilmington officials is that the reasonably anticipated future uses of the property continues to be commercial/industrial. Therefore, EPA developed the set of cleanup objectives for the Property during the remedy selection process with this anticipated future land use in mind. The RAOs developed to address soil contamination resulted in a set of remedial alternatives to address the ecological and human health risks posed by the Site, including the human health risks posed by the contamination on the Property that would need to be addressed to make the Property ready for commercial/industrial re-use.

Section 121(b)(1) of CERCLA presents the factors that, at a minimum, EPA is required to consider in its assessment of remedial alternatives. The selected remedies for soil (cap or cover systems for soil across the Property to prevent exposure and potential leaching; removal of contaminated soil and sediments from wetland areas and wetland restoration; treatment of LNAPL-contaminated soil via MPE; and vapor intrusion evaluations and/or mitigation systems for TMP-contaminated soil) meet the five principal requirements for the selection of remedies in CERCLA Section 121 and the nine criteria (see further discussion in **PART 2, Section K, SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES** of this ROD, above).

Low-level threat wastes are source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The NCP, which governs EPA cleanups, at 40 CFR § 300.430(a)(1)(iii), states that EPA expects to use "treatment to address the principal threats posed by a site, wherever practicable" and "engineering controls, such as containment, for waste that poses a relatively low long-term threat" to achieve protection of human health and the environment. Wastes that are generally considered to be low-level threat wastes include non-mobile contaminated source material of low to moderate toxicity, surface soil containing Site contaminants that are relatively immobile in air or groundwater, low-leachability contaminants, or low toxicity source material. Low-level threat wastes on the Olin property include soil impacted with chromium and BEHP. These materials will be addressed by installing a permanent, low-permeability cover over the Containment Area and installing soil and/or asphalt cover systems for contaminated upland soil. Institutional Controls and long-term maintenance of covers and caps will be used to address these materials over the long term.

The NCP describes EPA's expectations for groundwater restoration and states that EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction. Since portions of the aquifer at the Site are classified as drinking water sources and since MassDEP has assigned a high use and value for the Site area aquifer, the goal for the groundwater would be to restore this aquifer to its beneficial use, unless it is determined not to be practicable. Since there is insufficient data at this time to determine whether full restoration is practicable, EPA's objectives for this interim remedy are focused on removing the source, minimizing further migration of contaminants, and preventing exposure.

Further work is underway to finish characterizing the nature and extent of contamination in the aquifer and to develop and evaluate a set of alternatives to restore the groundwater to its beneficial use as a drinking water aquifer. Once this investigation is completed, EPA will issue a final ROD for groundwater identifying the final cleanup goals for groundwater at the Site.

EPA agrees that strong efforts should be made to hasten the pace of remedy design and implementation, while meeting EPA's obligations under CERCLA and the NCP. The investigations at the Site have been ongoing for a very long time, with little progress in the actual cleanup. While PDIs are needed to refine the details of the selected remedy, EPA expects these investigations to be focused and implemented expeditiously such that active cleanup is initiated as soon as possible. The dynamic of work at the Site must shift such that the PDIs do not become another long-term phase of the investigation.

Please see also EPA's responses to Comments #1, #14, and #16 in **Section B**, above, and Comment #1 in **Section C, I**, above.

Comment #6 (C. Baima, S. Baima)

Institutional Controls should not be relied upon (such as for TMPs) when remediation is an option.

EPA Response:

Please see EPA's responses to Comments #20 and #30 in **Section C, II**, above.

Comment #7 (C. Baima, J. Baima, S. Baima)

The goal for groundwater should be to restore the aquifer to drinking water conditions.

EPA Response:

Please see EPA's responses to Comments #1 and #14 in **Section B**, above.

Comment #8 (L. Brooks)

Will Transrail be allowed on Olin's property to begin construction for operation? If land is disrupted before cleanup is complete, contamination may spread further.

EPA Response:

Please see EPA's responses to Comments #2 and #17 in **Section B**, above and Comment #2 in **Section C, IV**, above.

Comment #9 (S. Baima)

The PRPs should have no influence over the selection of a final remedy.

EPA Response:

Please see EPA's response to Comment #19 in **Section B**, above.

Comment #10 (S. Baima)

Alternative DAPL/GWHS-4 is preferable to DAPL/GWHS-3 because it removes more surface material. The temporary environmental impact of the installation of more wells is an acceptable price to pay for additional wells.

EPA Response:

Please see EPA's responses to Comment #3 in **Section B**, above and Comments #22, #24, #25, and #26 in **Section C, II**, above.

Comment #11 (S. Baima)

The PRGs for LNAPL and surface water appear to be using a mix of averages and "not to exceed" limits for ammonia and chromium. How is it appropriate to compare an average value to a "not to exceed" limit when you could fail the limit with high individual readings?

EPA Response:

The Proposed Plan contained performance standards for chromium and ammonia in surface water developed in accordance with EPA Guidance for *Aquatic Life Ambient Water Quality Criterion – Freshwater* (USEPA, 2013) to establish the Criterion Continuous Concentration (CCC). The CCC is a value below which adverse effects would not be expected for the majority of aquatic receptors. The site-specific chromium CCC of 0.10 mg/L was documented in Table 3.12-3 of the BERA. This concentration, for dissolved chromium, was calculated using EPA equations for deriving hardness-dependent criteria using the arithmetic mean of surface water hardness for the South Ditch Stream (177 mg/L Calcium Carbonate [$CaCO^3$]). Using an arithmetic mean for determining hardness is an appropriate approach for addressing the variability in this parameter and consistent with guidance.

The site-specific ammonia CCC was calculated based on site-specific surface water temperature and pH data consistent with Table N-1 in Appendix N of *Aquatic Life Ambient Water Quality*

Criteria for Ammonia –Freshwater (USEPA, 2013). The Proposed Plan contained a performance standard for ammonia in surface water of 15 mg/L based on an average temperature of 9.2°C and a pH of 7.13. As noted in EPA's response to Comment #10 in **Section B**, above, EPA has re-evaluated the performance standard for ammonia in surface water and believes that the performance standard should be based on the 95% Upper Confidence Limit (UCL) of temperature data from mid-May through June (18°C) and has revised the performance standard in the ROD to 9 mg/L. Using the 95% UCL for temperature is an appropriate approach for addressing the variability in this parameter and consistent with guidance.

It is important to note that the surface water performance standards are instream levels, protective of organisms over the long term (*e.g*., chronic conditions). To evaluate whether the remedy is functioning as designed, surface water samples will be taken at different locations within the stream and compared to these performance standards to evaluate the effectiveness of the remedy. Exceedances of the performance standards at a particular location may result in modifications to the remedy or may result in further evaluations including toxicity testing. In summary, the use of statistical methods such as UCLs, averages, and arithmetic means for characterizing the conditions of the stream *(i.e*., hardness, temperature, and pH) is an appropriate means to determine the performance standards. Long term monitoring results will be compared to these performance standards to determine if the remedy is functioning as designed and sufficiently protective.

Comment #12 (S. Baima)

The USACE water quality certification allows for wetland intrusion only if that intrusion is temporary and for remediation activities. While remediation activities will impact wetland areas, some impacts may be necessary to remove contaminants. The wetlands should be restored to the greatest extent possible.

EPA Response:

EPA agrees with the substance of this comment. Restoration of wetlands impacted by remedial activities is included in the selected remedy. EPA will minimize potential harm and avoid adverse impacts to wetlands, to the extent practicable, by using best management practices to minimize harmful impacts on wetlands, wildlife, or habitat. Any wetlands affected by remedial work will be restored and/or replicated consistent with the requirements of federal and state wetlands protection laws with native wetland vegetation, and any restoration efforts will be monitored. Mitigation measures will be used to protect wildlife and aquatic life during remediation, as necessary. Please see also EPA's response to Comment #8 in **Section C, II**, above.

V. Written comments submitted by WWI LLC on October 26, 2020

Comment #1

How does the fact that additional sampling is anticipated affect the proposed cap for the Containment Area? Does EPA anticipate that additional investigation and remediation will affect the design and installation of the permanent cap? Will the cap be installed after the data gap investigation is complete?

EPA Response:

Additional investigation and remediation are not expected to significantly change the plan for the cap. The data gap investigation in the area of the Containment Area is anticipated to be completed prior to final cap design and installation.

Comment #2

The removal of DAPL and highly contaminated groundwater is expected to take 8 years. Does EPA anticipate that the permanent cap would be installed after DAPL removal, or can DAPL removal proceed with the permanent cap in place?

EPA Response:

The implementation sequence for the remedy will be defined during the design. However, EPA anticipates that DAPL and hot spot groundwater extraction wells within the area of the Containment Area cap will be installed before the permanent cap is constructed.

Comment #3

The cap over the Containment Area has not yet been designed. Would EPA consider a building, designed to address potential vapor intrusion, as a component of that cap? If the building is not designed as part of the cap, could the cap be designed and constructed to allow for a building to be installed in the future? Note that this has occurred at other NPL sites. We can work with Olin on the specifics of integrating a building into cap design but request clarification that such an approach would be acceptable.

EPA Response:

The cap over the Containment Area must be designed and constructed to meet ARARs, specifically the performance requirements of RCRA Subtitle D criteria for solid waste landfills and Massachusetts solid waste landfill regulations to minimize infiltration. It is possible that a building could be designed and constructed to meet these requirements. It is also possible that the permanent cap could be designed and constructed to allow the installation of a building above the cap. If a building is constructed in this area, it must be constructed to ensure that vapor intrusion issues are mitigated and that the structure does not interfere with all other aspects of the remedy, including the extraction and monitoring of DAPL and groundwater.

Comment #4

The remedial plan for on-Site soil also includes some soil excavation and capping with either asphalt or soil cover. It appears to that the selection of asphalt or soil is consistent with existing conditions, e.g. replacing soil with soil, and asphalt with asphalt. The proposed redevelopment involves the construction of a large warehouse building. Is EPA amenable to a "cap" consisting of a building, rather than asphalt or soil?

EPA Response:

The upland soil on the Olin property (Property) pose an ecological risk to various species. To mitigate these risks, EPA's remedy includes covering these soils with either clean soil or

pavement to eliminate the exposure pathway for these species. Construction of a building over those soils that pose a risk can also achieve the RAOs. However, the building would then become a component of the remedy and as such, the design, construction, and long-term maintenance would necessarily be conducted under the oversight and approval of EPA.

Comment #5

The Proposed Plan includes the collection and treatment of highly contaminated groundwater and product and the construction of a new treatment building, shown as being located near Plant B. WWI suggests that EPA consider locating the treatment building off-Property for the following reasons: the location depicted in the Proposed Plan would require installation of piping through much of the developable area of the Site and complicate future redevelopment, would require an increase distance to pipe contaminants (increasing potential for release) and would cross at least one wetland. Instead, WWI suggests that the treatment plant be located on 1 Jewel Drive.

EPA Response:

The location of the treatment plant in the Proposed Plan is conceptual and may be revised during the design phase. EPA is amenable to an alternate treatment plant location as long as it meets location-specific ARARs.

VI. Written comments submitted by MIT community/MIT Superfund Research Program (J. Kay, K. Vandiver, J. Beard, B. Engelward, T. Swager) October 22-26, 2020

Comment #1 (MIT SRP)

We agree that continued quarterly monitoring of the 18 currently tested residential wells for nitrosamine contamination is appropriate, but should be expanded to include other nitrosamines and contaminants beyond NDMA only.

EPA Response:

It has been concluded over many years of collecting groundwater samples at the Site that NDMA is both the most toxic and most mobile of all the target analytes and this chemical has been used to define the extent of groundwater impacts at the Site. The available data shows NDMA to be more widespread than any other nitrosamines that have been analyzed for at the Site; addressing the major sources of NDMA to the aquifer – DAPL and groundwater hot spots – will result in addressing other nitrosamines that are present in environmental media. NDMA concentrations in the currently tested private residential wells are orders of magnitude lower than concentrations in DAPL and groundwater hot spots, and EPA expect these levels in residential wells to decline even further upon implementation of the interim remedy for OU3.

The sampling effort for private wells under the Superfund program was initiated in October 2009 and has evolved over time. Initial samples were analyzed quarterly for the target analytical list as

required by the *Final RI/FS Work Plan* (MACTEC, 2009).[29] The initial analyte list included 74 semi-volatile organic compounds (SVOCs), inorganics (ammonia, sulfate, chloride, nitrate, and nitrite), metals (sodium, chromium, and hexavalent chromium), NDMA, and n-nitrosodipropylamine (NDPrA). NDPrA detections were reported with NDMA as per EPA drinking water Method 521. Over time, the list of target analytes was narrowed based on ongoing results. SVOC analyses were discontinued for multiple wells due to a lack of detections.

Other nitrosamine compounds besides NDMA were sampled in known impacted wells GW-10S and GW-10D and there were no detections above EPA Regional Screening Levels (RSLs), which are conservative risk-based values. These wells are located on the Olin property (Property) in close proximity to the Jewel Drive DAPL pool. Given their location near an area of elevated NDMA concentrations in groundwater, these wells would be likely to exhibit concentrations of other nitrosamines, if present. Samples from these wells were analyzed for n-nitrosodi-n-butylamine (NDBA), NDPrA, n-nitrosodiethylamine (NDEA), NDMA, n-nitrosomethyleythylamine (NMEA), n-nitrosopiperidine (NPIP), and n-nitrosopyrrolidine (NPYR). For GW-10S, based on reporting limits ranging from 1.9 ng/L to 4.8 ng/L, the laboratory did not report any positive detections of these compounds. For GW-10D, the laboratory reported low, estimated (J-flagged) detections of NDBA (4.9 ng/L (J)) and NMEA (0.5 ng/L (J)), along with an NDMA concentration of 220 ng/L (J). A comparison of the estimated detections of NDBA and NMEA to the EPA RSLs did not indicate unacceptable human health risks.

In summary, the results support the conclusion that NDMA is the predominant compound of concern among the Method 521 analyte list as it was detected at the highest concentration and has the lowest tapwater RSL. Based on the results, EPA did not require Olin to conduct further groundwater sampling and analysis in the residential monitoring program for NDPrA, NDEA, NMEA, NPYR, NPIP, or NDBA. In addition, during design of the remedy and implementation of the data gaps work, EPA will continue to evaluate the nature and extent of all nitrosamines at the Site. For example, it will be important to evaluate and confirm that treatment systems are adequately addressing the full list of nitrosamines. Confirmation sampling from certain select wells and the influent and effluent from the treatment systems will be implemented to confirm our conclusions thus far.

Comment #2 (MIT SRP)

It is extremely important to characterize the full chemical composition of DAPL in order to understand health risks to the community.

EPA Response:

EPA believes that sufficient characterization of DAPL has occurred to understand the health risks to the community. While conductivity is often used as a primary indicator or screening tool, DAPL has been analyzed for a broad spectrum of contaminants and characteristics as listed in Table 3.1-1 of the *Final RI/FS Work Plan* (MACTEC, 2009), including VOCs, SVOCs including

[29] See MACTEC, 2009. Field Sampling Plan, Volume III-A, Table 3.1-1.

the nitrosamines NDMA, NDPrA, and NDPhA, total and dissolved metals, alkalinity, anions, ammonia, phthalic acid/phthalic anhydride, specific conductance, specific gravity, total organic carbon, and specialty compounds including 1,1-dimethylhydrazine, acetaldehyde, formaldehyde, Kempore, methylhydrazine, Opex, and perchlorate. The most recent RI report summarizing these results is the *June 2019 Draft OU3 RI Report* (Wood, 2019). Please see also EPA's response to Comment #1 in **Section C, VI,** above.

In addition, DAPL chemistry has been evaluated in technical bulletins and articles, including the following:

- Eary, L. E. and Davis, A., 2007. Geochemistry of an acidic chromium sulfate plume. Applied Geochemistry 22, 357-369.
- Geomega, 1999. Technical Series 3: Results of August 1998 multilevel piezometer samping event and DAPL/diffuse layer discrimination analysis. January 8.
- Geomega, 2004. Technical Series 37: Conclusion of the laboratory column test simulating aquifer pumping for DAPL removal. December 28.

Table 1.1 of the *Focused RI Report – DAPL* (AMEC, 2017) identifies the 33 monitoring wells and multi-port piezometers screened in DAPL; Table 4.1 summarizes all the chemical analyses that were conducted for each of those groundwater monitoring wells and multi-level piezometer ports. Tables 4.2-1, 4.2-2, and 4.2-3 include all of the analytical data for organics (including NDMA and NDPhA), inorganics, and non-standard analytes (including hydrazine, unsymmetrical dimethylhydrazine (UDMH), monomethylhydrazine (MMH), formaldehyde, dimethylformamide, acetaldehyde, Opex, and Kempore). Table 2.3-8 of the Draft Baseline Human Health Risk Assessment for OU3 (Draft 2019 OU3 BHHRA) – Attachment K of the *June 2019 Draft OU3 RI Report* (Wood, 2019) – summarizes analytical data for compounds detected at least once among samples collected from DAPL monitoring wells sampled between May 2010 and June 2016; the table includes full-suite analyses of DAPL samples including organics (VOCs and SVOCs, including NDMA, NDPrA, and NDPhA), volatile petroleum hydrocarbons (VPH), metals, inorganics, and specialty compounds (including hydrazine, UDMH, MMH, formaldehyde, dimethylformamide, acetaldehyde, Opex, and Kempore). The current data set indicates that NDMA is the predominant nitrosamine compound in DAPL. In addition, as noted in the previous response, during design of the remedy and implementation of the data gaps work, EPA will continue to evaluate the nature and extent of all nitrosamines at the Site.

Comment #3 (MIT SRP)

MIT is concerned regarding the proposed method of "pump and treat" for DAPL. Historically, pump-and-treat is ineffective because the entire mass cannot be treated simultaneously and turnover rates are extremely slow relative to the size and dynamics of the plume. Even if treated effectively, upon reinjection it returns to the plume and facilitates plume migration, and may still contain precursors that may re-form hazardous materials. For example, pump and treat of trichloroethene (TCE) on Cape Cod has not reduced contamination.

EPA Response:

The extraction and treatment method planned for DAPL has several major differences with traditional groundwater pump-and-treat, as described below.

- The DAPL targeted by the selected remedy has collected in bedrock depressions over time and is isolated from most groundwater advective flow. While EPA remains concerned that some of the DAPL has migrated over time via bedrock fractures, the targeted DAPL mass is not migrating measurably.
- There are no plans to reinject treated DAPL directly to the source area. If reinjection is contemplated in the future, further studies will be conducted to evaluate the feasibility of this action. Studies will be conducted to evaluate and optimize the on-site treatment of DAPL prior to off-site disposal of the residuals. The goal will be to pre-treat the extracted DAPL to reduce its volume as much as possible, thus reducing the volume of residuals requiring off-site disposal. There will be two waste streams from the treatment, a solid waste stream which will be containerized and then disposed of off-site and a liquid waste stream which will be evaporated. If it is not feasible to treat DAPL on-site, extracted DAPL will be disposed of off-site at a permitted facility licensed to receive such wastes.
- The planned extraction is designed to minimize mixing of DAPL and overlying groundwater. The proposed DAPL extraction rates are very low to match the rate of gravity flow, and the extraction screens will be placed at the top of bedrock to capture as much DAPL as possible and minimize entrainment of overlying groundwater. EPA has also selected a remedy for DAPL that includes a larger number of extraction wells in order to reduce the pumping rate at any given extraction point but still allow for extraction to proceed at a reasonable pace.

It is also important to note that Olin conducted a pilot test to evaluate extraction rates for DAPL that allow for removal of DAPL while minimizing the mixing of the overlying groundwater. Approximately one million gallons of DAPL have been successfully removed from the Jewel Drive DAPL pool to date.

With respect to the use of pump-and-treat technologies utilized to address TCE contamination on Cape Cod, EPA disagrees with the commenter's conclusion. Significant plume reduction and aquifer restoration has been achieved on Cape Cod using pump-and-treat technologies. Reinjection of the treated groundwater also helped contain the plumes as the reinjection was designed to create hydrologic highs that served to funnel the contaminated groundwater towards the extraction wells. A review of the historical extent of contamination compared to current extent showed dramatic decreases in the nature and extent.

Comment #4 (MIT SRP)

The proposed final actions for LNAPL and soil/sediment are not satisfactory. MIT is concerned about the efficacy of pumping and treatment for LNAPL. Considering the history of chemical disposal, NDMA precursors and other chemicals are likely present in the LNAPL and soil/sediment, and more aggressive assessment and response is needed. Olin manufactured nitrosamine products, such as NDPhA (Wiltrol N) and Opex, which may be less mobile in the environment than NDMA due to soil sorption, necessitating more aggressive soil remediation. The acidity of the Site's waste, combined with these nitrosamines, may create conditions favoring ongoing formation of more mobile nitrosamines such as NDMA that could

continue to leach to groundwater. In addition, numerous nitrosamine precursors or materials known to create nitrosamine-forming conditions are known or highly likely to be present in LNAPL and soil/sediment, including hydrazines, raw material for Nitropore 5PT, and aqueous ammonia and chlorine.

EPA Response:

EPA believes that adequate site characterization has occurred to develop sets of alternatives to address LNAPL contamination and contamination in soil and sediments, and believes that the selected remedies for LNAPL and soil and sediment contamination are appropriate. EPA acknowledges that the LNAPL process oil was known to contain NDPhA as well as other constituents, however, NDPhA was not detected in surface soil or shallow subsurface soil at Plant A/C-1 or the Plant D Tank Farm where most of the hydrazine detections in soil were located; the hydrazine and NDPhA detections in soil are not co-located and therefore would not have the opportunity to react together. In addition, EPA is not of the opinion that there are currently acidic conditions in soil (a requisite for nitrosation) where the hydrazine has been detected (see below for further discussion of acidic conditions). Given the relatively small volume of LNAPL and its limited aerial extent, EPA does not believe the LNAPL is a significant source of groundwater contamination as compared to DAPL.

EPA notes that more than 400 soil samples were collected for nitrosamines (NDMA, NDPrA, and NDPhA), ammonia, chloride, and sulfate analysis. In addition, approximately 200 soil samples were collected and analyzed for 1,1-dimethylhydrazine, acetaldehyde, dimethylformamide, formaldehyde, hydrazine, and methylhydrazine. The LNAPL, soil, and sediment data indicate that NDMA precursors are not present at most sample locations, and where present, are at low concentrations and without the acidic conditions that would be needed to sustain reactions and create additional nitrosamines.

The acidic waste on the Olin property (Property) was in the liquid waste streams that were discharged to unlined lagoons and pits (including the one referred to as "Lake Poly") from 1953 to around 1970. These disposal areas are distinct from the LNAPL/Plant B area and range from more than 300 feet to more than 1,000 feet to the southwest. That waste stream ultimately resulted in the formation of DAPL. Lake Poly soil was excavated to bedrock and disposed of off-site. There is no corollary acidic waste distributed within soils on the Property where NDPhA is found. EPA does not believe that the conditions that previously existed in the chemical manufacturing processes and the discharges of associated liquid wastes currently exist in soil, sediments, or the LNAPL area at the Property.

Please see also EPA's response to Comment #10 in **Section C, III** above for a discussion of LNAPL excavation and EPA's responses to Comment #8 in **Section B**, Comment #14 in **Section C, II**, and Comment #1 in **Section C, IV**, above, for a discussion of removal of impacted soils.

Comment #5 (MIT SRP/recommendation letter)

Because the slurry wall was not installed to bedrock and leaves opportunity for fluid transport, ongoing NDMA production will continue to contaminate the groundwater of Wilmington unless chemical sources (hydrazines, aqueous ammonia and chlorine) are removed and an effective barrier constructed.

Containment walls should be installed that extend to bedrock and a permanent, secure, impermeable cap should be installed.

EPA Response:

The slurry wall of the Containment Area feature was constructed to bedrock; however, EPA believes there may be some degree of groundwater leakage at the interface between the slurry wall and bedrock surface because the slurry wall was not keyed or grouted into the bedrock during construction. The open equalization window may also contribute to the inability of the current Containment Area design to adequately contain Site contaminants. EPA's selected interim remedy for DAPL and hot spot groundwater includes extraction wells both inside and outside of the slurry wall to remove these liquid sources of contamination and reduce the potential for ongoing NDMA production instead of trying to contain them with physical barriers. The addition of a permanent, low-permeability cap and closure of the equalization window will also address the threat of future leaching of Site contaminants associated with the soils and solid waste within the Containment Area. EPA has concluded that these two components of the remedy in this area (extraction for liquid waste and capping for solid waste) will provide adequate source control for the Containment Area. Please see also EPA's responses to Comment #5 in **Section B,** Comment #32 in **Section C, II**, and Comment #4 in **Section C, III**, above.

Comment #6 (MIT SRP/J.Beard/N. Owiti/S. Kaushal)

N-nitrosamines, a class comprising hundreds of chemicals, are among the most potent carcinogens known. Over 70 n-nitrosamines have been documented to cause cancer in animals, and most are not currently tested for at the Olin Site. For example, n-nitrosodiethylamine (NDEA) is even more toxic and carcinogenic than NDMA, and given its structural similarity, it is almost certainly present, but does not appear to have been routinely measured.

Given the known contamination of the Site with additional nitrosamines and potential for even more toxic nitrosamines, it is important to take measures to identify, monitor and remediate other nitrosamines and potential carcinogens in DAPL, LNAPL, and groundwater.

EPA Response:

It has been concluded over many years of collecting groundwater samples at the Site that NDMA is both the most toxic and most mobile of all the target analytes and this chemical has been used to define the extent of groundwater impacts at the Site. As noted previously, prior investigations carefully evaluated whether other nitrosamines were present at levels that posed a risk. Specifically, two key monitoring wells known to be representative of known source areas were sampled in 2012 and analyzed for the nitrosamines NDBA, NDPrA, NDEA, NDMA, NMEA, NPIP, and NPYR (see discussion in Comment #1 in **Section C, VI**, above). NDEA was not detected in either of the wells at a reporting limit of 1.9 ng/L while NDMA concentrations ranged up to 4,600 ng/L in these two wells from 2011 to 2019. Based on these evaluations, EPA has concluded that NDEA is not a contaminant of concern at the Site. However, EPA will continue to evaluate this issue as part of the remedial design for the remedy to ensure that the groundwater treatment is sufficient to address all nitrosamines. For example, during pre-design activities key

monitoring wells can be sampled for verification of key contaminants. In addition, the treatment system influent and effluent will be analyzed for a full suite of contaminants including all nitrosamines to confirm sufficient treatment prior to discharge to surface water. Please see also EPA's response to Comment #3 in **Section C, VI,** above.

Comment #7 (MIT SRP)

N-nitrosodiphenylamine (NDPhA), which was manufactured at the Site and has been found in Olin LNAPL and groundwater, is a substantial concern. NDPhA is an EPA class B2 probable carcinogen and is a precursor for NDMA. Given the relative thermal instability and low volatility of NDPhA, gas chromatography/mass spectrometry (GC/MS) analysis of this chemical is problematic and thus results of analysis likely underestimates the true level of contamination. Even so, NDPhA has been detected at unacceptably high levels.

EPA Response:

EPA believes that the range of possible nitrosamines has been adequately characterized. NDMA has been identified as the predominant nitrosamine compound in environmental media at the Site, and the data from the Site investigation and monitoring efforts demonstrates that NDMA is the most significant human health risk contributor. Please see also EPA's responses to Comments #1 and #6 in **Section C, VI,** above. NDPhA has exceeded the tapwater RSL of 12 ug/L on the Olin Property in shallow overburden groundwater near Plant B and in deep overburden groundwater north of the on-property DAPL pool, with a maximum concentration of 400 ug/L (GW-16R, November 2009). These exceedances are limited to small areas on the Olin Property.

Although EPA believes that adequate characterization for nitrosamines has occurred, EPA will evaluate the use of other analytical methods such as liquid chromatography with tandem mass spectrometry (LC/MS) for analysis of groundwater samples collected as part of the planned remedial design and data gap investigation to eliminate potential degradation concerns from GC/MS. Limited sampling is planned during design to ensure that the treatment components adequately address all possible contaminants.

Comment #8 (MIT recommendation letter)

Ongoing nitrosamine formation and nitrosamine levels over time should be monitored. The MIT SRP team is developing a rapid NDMA sensor and offers to test NDMA concentrations in and around the Olin Site, and also request access to water samples. Likewise, the MIT SRP team is developing analytical approaches to detect and identify multiple nitrosamines and requests surface water and groundwater samples for analysis.

EPA Response:

The Site is routinely monitored for NDMA concentrations using EPA-approved methods. The data collected does not show evidence of ongoing nitrosamine formation. EPA is aware that MIT is developing an NDMA rapid sensor and has suggested that MIT work with Olin on a proposal to test this sensor using samples collected at the Site and validated by other approved methods.

Comment #9 (MIT recommendation letter)

EPA should communicate the intended fate of treated, excavated or otherwise removed contamination. Note that contaminants should not be transferred to another site that risks human exposure.

EPA Response:

The selected remedy involves extracting and treating the groundwater. Currently, the plan is to discharge the treated groundwater to surface water. Prior to discharge, the water must meet performance standards that are safe for human health and the environment. In the event it is determined that it is beneficial to reinject the groundwater, EPA will establish injection standards protective of this discharge option. The selected remedy also includes extracting and treating DAPL. The proposed treatment process for DAPL will result in a solid waste that must be disposed of off-site. The treatment also involves evaporation of any wastewater. Any solid or sludge generated from the treatment of DAPL and groundwater and any contaminated sediments excavated from the wetlands will be taken off-site to a disposal facility that has been approved to accept CERCLA waste. EPA will review and approve all disposal facilities used for wastes from the Site to ensure that they are in compliance with the regulations governing their continued operation.

Comment #10 (MIT recommendation letter)

A critical evaluation should be performed for pump and treat of LNAPL to ensure that evidence of efficacy is established and treated waste is tested for remaining contaminants and nitrosamine precursors before re-release to the environment. Treated water should also be treated for nitrosamines other than NDMA and NDPhA prior to discharge.

EPA Response:

MPE is a proven technology for the extraction and treatment of LNAPL. The selected remedy also requires monitoring of the discharge from the treatment system to demonstrate it achieves levels protective of surface water and sediments prior to discharge. Please see also EPA's response to Comment #3 in **Section C, VI,** above.

Comment #11 (MIT recommendation letter)

If nitrosamine concentrations do not decrease significantly, alternative remediation methods should be identified and applied.

EPA Response:

The selected remedy includes long-term monitoring of contaminants in the aquifer to demonstrate that the remedy is functioning as it was designed. As part of this monitoring, contaminant trends will be evaluated and if progress is not demonstrated, other actions will be evaluated and implemented as part of the final remedy selected for groundwater (OU3). Furthermore, as part of the selected remedy, Five Year Reviews will be required for as long as contamination remains in

place at concentrations above unrestricted use, and these reviews will evaluate how well the remedy is performing.

Comment #12 (A. Moise)

Longitudinal studies should be conducted to track changes in concentration of NDMA, NDMA precursors, and other chemicals in LNAPL, DAPL, and soil as remediation progresses.

EPA Response:

The selected remedy includes monitoring of all aspects of the remedy, including groundwater, surface water, soil, and sediments to demonstrate remediation progress and whether the cleanup levels and performance standards have been achieved. Pre-design studies will evaluate the presence and impact of NDMA precursors on the remedy and if further monitoring is needed over time. Please see also EPA's response to Comment #11 in **Section C, VI,** above.

Comment #13 (H. Feng)

Further investigations should be conducted to understand the impact of contaminant migration via bedrock fractures, especially since prior activities have not involved removal of contamination from fractures.

EPA Response:

EPA agrees. Contaminant migration in bedrock has been identified as a data gap for the Site, and additional characterization activities to identify bedrock fractures and the potential impact of contaminated groundwater and DAPL in bedrock fractures and within the bedrock matrix are planned as part of the ongoing data gap work, which will lead to the final ROD for groundwater (OU3).

Comment #14 (H. Feng)

Did the DAPL pilot program include studies on how the act of extraction may impact contaminant migration in the surrounding areas? When the municipal wells were in operation, they resulted in upward migration of contaminants.

EPA Response:

The DAPL pilot program was intended to determine the feasibility of DAPL extraction and a sustainable extraction rate for DAPL, and associated monitoring evaluated the potential for entrainment of groundwater into the DAPL pool. The pilot test demonstrated that extraction rates around 0.25 gallons per minute (gpm) were sustainable in the Jewel Drive DAPL pool and would not result in excessive mixing of groundwater and DAPL and fouling in the extraction wells. The total combined extraction rate from all 20 DAPL extraction wells is estimated at 8 gpm or 11,520 gallons per day. Given the low extraction rates determined to be sustainable to prevent mixing, minimal impact is expected on groundwater flow above the DAPL pools. In contrast, the municipal wells were located on the far side of the MMB wetlands and pumped a significant

volume of groundwater (combined flow rate of more than 5 million gallons per day when all six Town wells were in operation). The CSM for the Site suggests that Town wells had a strong influence on the migration of contamination from the Site, pulling the contamination plume in from both below the wells and from across the aquifer.

Comment #15 (J. Beard)

The Proposed Plan states that NDMA will be destroyed with "ultra-violet (UV) photo-oxidation" and it is unclear if this is UV irradiation or if the intent is to pair UV light with the addition of an oxidant. If the latter is correct, it has been shown that UV/O_3 can reduce the formation of the secondary amine during photolysis, somewhat mitigating re-formation of nitrosamines.

EPA Response:

The selected remedy includes the use of UV photo-oxidation to treat NDMA in groundwater and DAPL. The details of the technology will be developed further during design to ensure that the performance goals can be achieved, and the suggestion in the comment will be taken into consideration.

Comment #16 (J. Kelly)

The transport of contaminants through different media is highly uncertain and difficult to predict, therefore, contaminants have the potential to migrate into the air both outside and in peoples' homes. Both indoor and outdoor air should be monitored for contaminants as well as their degradation products.

EPA Response:

Most of the contaminants found at the Site do not have the potential to migrate into air under ambient conditions at levels that pose an unacceptable risk. TMPs were detected on the Olin property-portion of the Site and the selected remedy for this area includes further evaluation of vapor intrusion impacts or the use of vapor mitigation systems if buildings were to be constructed in this area. Beyond this area, no other air impacts are anticipated. In addition, routine air sampling is conducted as part of the normal health and safety procedures during implementation of the remedy when there is a risk (usually due to the nature of the contaminants) that a release to the ambient air is possible. Such routine monitoring will be implemented when work proceeds at the Site.

Comment #17 (J. Kelly)

Environmental monitoring of contaminants should be expanded to also include degradation products.

EPA Response:

The investigations at the Site have included monitoring and analysis of numerous contaminants, and where appropriate, degradation products have been included in the analysis. The commenter did not provide further information on which contaminants and degradation products they believe have been omitted from our analysis and why further analysis of these contaminants are needed.

Therefore, further response cannot be provided. Please see also EPA's responses to Comments #1 and #6 in **Section C, VI**, above.

Comment #18 (S. Kaushal)

Genetic variability profoundly impacts the biological consequences of NDMA exposure. The *in vivo* studies that form the basis for federal NDMA health hazard assessment were performed in wild type animals, but humans are known to vary widely in their capacity for repairing NDMA-induced DNA damage, so existing risk assessments do not account for highly susceptible populations.

EPA Response:

The EPA human health risk assessment process does account for sensitive subpopulations in both the development of toxicity values and through exposure assessment, which characterizes the magnitude of exposure to a receptor. The toxicity values for NDMA have undergone an extensive review process and are suitable for risk assessment purposes. Additionally, the methodologies for developing the toxicity values do take into account uncertainty from extrapolating from animal models to humans. Another way the risk assessment process accounts for sensitive populations is in the exposure assessment phase. Sensitive receptors including children were evaluated as part of the risk assessment. Exposure parameters were selected to represent what is considered the reasonable maximum exposure, or the maximum exposure that is reasonably expected to occur at a site. This approach follows the EPA Risk Assessment Guidance for Superfund[30] and ensures that potential impacts to sensitive populations are captured by the human health risk assessment.

[30] EPA Risk Assessment Guidance for Superfund, Part A.